"A PROSPECTIVE, RANDOMIZED CONTROL STUDY COMPARING ULTRASOUND GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK VS CAUDAL EPIDURAL BLOCK FOR POSTOPERATIVE ANALGESIA IN CHILDREN UNDERGOING ELECTIVE LOWER ABDOMINAL SURGERIES"

Dissertation submitted to

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

In partial fulfilment for the award of the degree of

DOCTOR OF MEDICINE

IN

ANAESTHESIOLOGY

BRANCH X

INSTITUTE OF ANAESTHESIOLOGY AND CRITICAL CARE
MADRAS MEDICAL COLLEGE
CHENNAI- 600003

APRIL 2016

CERTIFICATE

This is to certify that the dissertation entitled, **"A PROSPECTIVE, RANDOMIZED CONTROL STUDY COMPARING ULTRASOUND GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK VS CAUDAL EPIDURAL BLOCK FOR POSTOPERATIVE ANALGESIA IN CHILDREN UNDERGOING ELECTIVE LOWER ABDOMINAL SURGERIES**" submitted by **Dr. POOVANNAN .D**, in partial fulfilment for the award of the degree of Doctor of Medicine in Anaesthesiology by the Tamil Nadu Dr. M.G.R. Medical University, Chennai., is a bonafide record of the work done by him in the INSTITUTE OF ANAESTHESIOLOGY AND CRITICAL CARE, Madras Medical College and government hospital, during the academic year 2013-2016.

Prof. DR. B.KALA M.D., D.A.,
PROFESSOR AND DIRECTOR,
INSTITUTE OF ANAESTHESIOLOGY
AND CRITICAL CARE,
MADRAS MEDICAL COLLEGE,
CHENNAI -600 003.

DR. R.VIMALA M.D.
DEAN,
MADRAS MEDICAL
COLLEGE &
GOVT. GENERAL
HOSPITAL,
CHENNAI – 600 003.

CERTIFICATE BY THE GUIDE

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Prof .DR .N. KRISHNAN M.D., D.A
Professor of Anaesthesiology,
Institute Of Anaesthesiology & Critical Care,
Madras medical college & Govt. General Hospital
Chennai- 600 003

DECLARATION

I hereby, solemnly declare that this dissertation entitled **"A PROSPECTIVE, RANDOMIZED CONTROL STUDY COMPARING ULTRASOUND GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK VS CAUDAL EPIDURAL BLOCK FOR POSTOPERATIVE ANALGESIA IN CHILDREN UNDERGOING ELECTIVE LOWER ABDOMINAL SURGERIES"** is a bonafide record of the work done by me in the Institute of Anaesthesiology and Critical Care, Madras Medical College and Government General Hospital, Chennai, during the Intraod 2013 – 2016 under the guidance of **DR. N. KRISHNAN M.D., D.A.,** Professor of anaesthesiology, Institute of Anaesthesiology and Critical Care, Madras Medical College, Chennai – 3 and submitted to **The Tamil Nadu Dr. M.G.R. Medical University, Guindy, Chennai – 32**, in partial fulfilment for the requirements for the award of the degree of M.D. Anaesthesiology (Branch X), examinations to be held on April 2016.

I have not submitted this dissertation previously to any university for the award of degree or diploma.

Place: Chennai **Dr .POOVANNAN .D**

Date:

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Above all I pay my gratitude to the Lord Almighty for blessing me to complete this work

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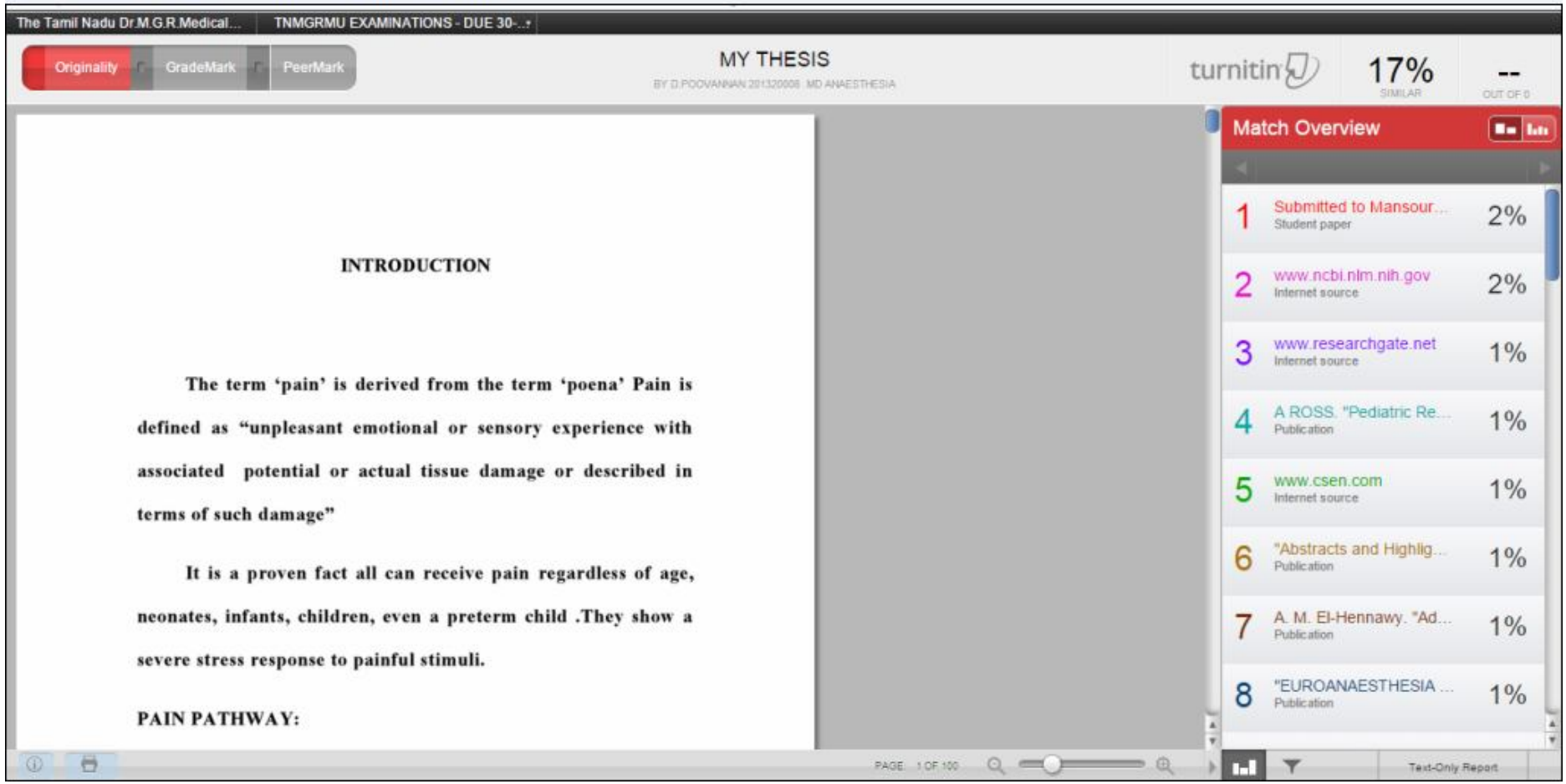
INTRODUCTION

The term 'pain' is derived from the term 'poena' Pain is defined as "unpleasant emotional or sensory experience with associated potential or actual tissue damage or described in terms of such damage"

It is a person feel all can receive pain regardless of age, neonates, infants, children, even a preterm child .They show a severe stress response to painful stimuli.

PAIN PATHWAY:

- At the time of injury, a local inflammatory response is induced by the noxious stimulus in the periphery i.e. nociceptor gets sensitized and these will be primary hyperalgesia.
- 'A' delta and 'C' fibres conduct the noxious stimuli to CNS which initiates a sequence of events i.e. reflex withdrawal from stimulus, avoidive behaviours and perception of pain.
- The sustained nociceptor input from 'C' fibres produces a central sensitization which alters neurons processing in spinal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PAIN PATHWAY:
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CONTENTS

AIM OF STUDY

This study compares the efficacy of ultrasound guided Transversus Abdominis Plane block and Caudal epidural block for post operative pain relief in children undergoing elective lower abdominal surgeries.

ABSTRACT:

Transversus Abdominis Plane Block has been reported to provide effective postoperative analgesia for lower abdominal surgeries. But there is not much data comparing Ultrasound guided Transversus Abdominis Plane Block with the Caudal Epidural Block, which is the most frequently used standard technique for pediatric lower abdominal surgeries. In this study we randomly selected 46 patients and divided in to two group. Group C received 1ml / kg of 0.25 % Bupivacaine Caudal block and Group T received Tap block using 0.3 ml / kg of 0.25 % Bupivacaine. The primary outcomes were the time to first analgesia in minutes and the analgesic doses required during the first 24 h postoperatively. The secondary outcome measures included FLACC pain scale score and intra operative hemodynamic variables.

RESULTS:

- Duration of analgesia was higher in TAP block group(9hrs 44minutes) compared to Caudal group (4 hours 5 minutes) which was statistically significant.
- FLACC pain score for analgesic assessment were better in the TAP block group compared to Caudal group, which was statistically significant.
-Post operative Heart rate ,Post operative Diastolic and Mean arterial pressure were better in the TAP block group compared to Caudal group, which was statistically significant.
- In both the groups, hemodynamic changes in intra operative period were comparable and insignificant

CONCLUSION:

From my study, I conclude that administration of Ultrasound guided TAP BLOCK for children undergoing Lower Abdominal Surgeries increases the duration of post operative analgesia without producing any adverse effects compared to Caudal epidural block. Thus, ultra sound guided TAP block can be used for prolonging the post operative analgesic effect.

KEY WORDS:

Bupivacaine, caudal, pediatric, postoperative analgesia, Transversus abdominis plane block, ultrasound, lower abdominal surgeries.

INTRODUCTION

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PAIN PATHWAY:

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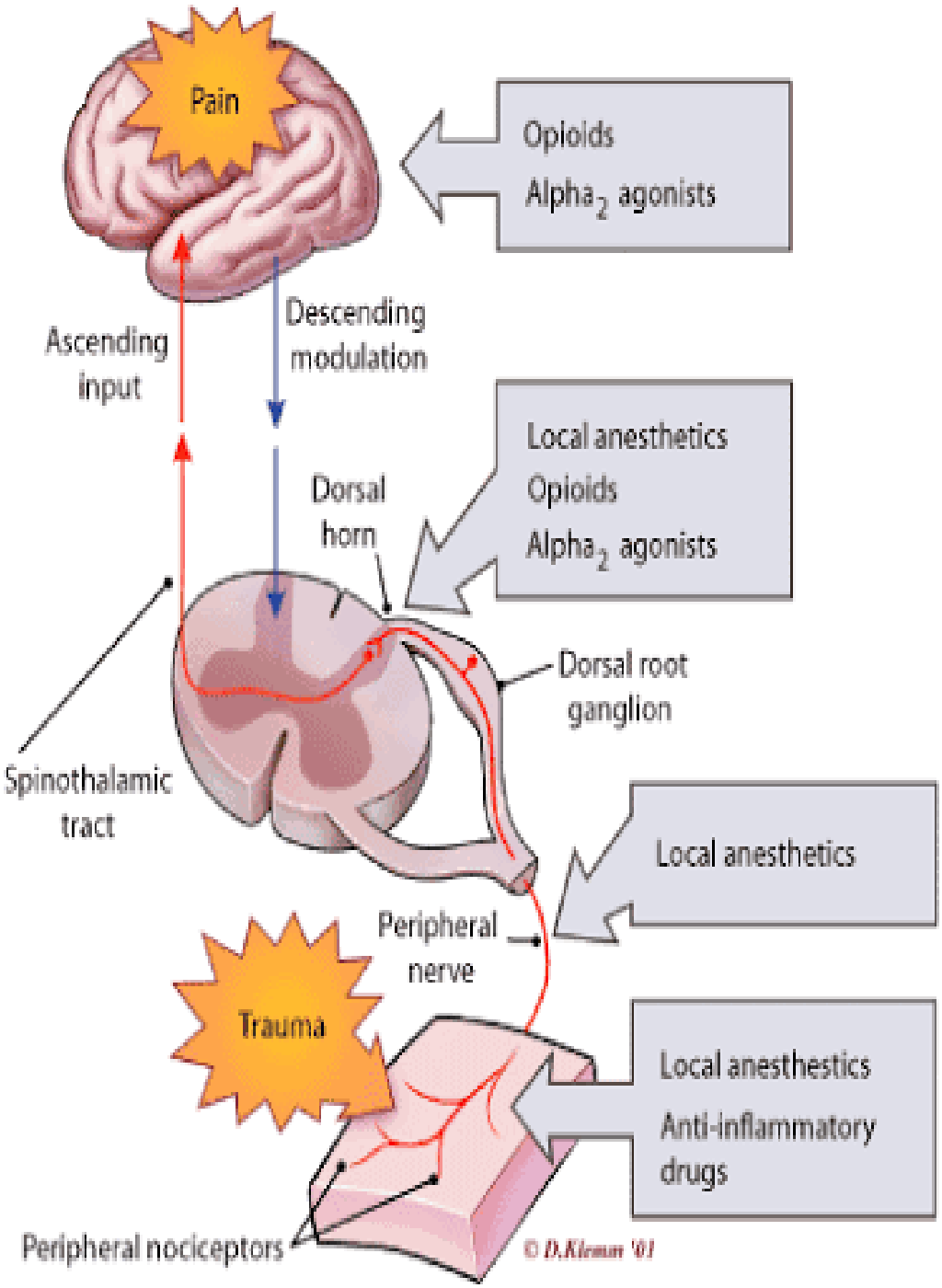
- ‘A’ delta and ‘C’ fibers conducts this noxious stimuli to CNS which initiates a sequence of events i.e. reflex withdrawal from stimulus, aversive behavior and perception of pain.
- The sustained noxious input from ‘ C ’ fibers produces a central sensitization which alters sensory processing in spinal cord (neuroplasticity) leading to allodynia and hyperalgesia at the site of injury.



The mechanism of pain response has certain differences in the early life (Neonatal period) from adults which are as follows:

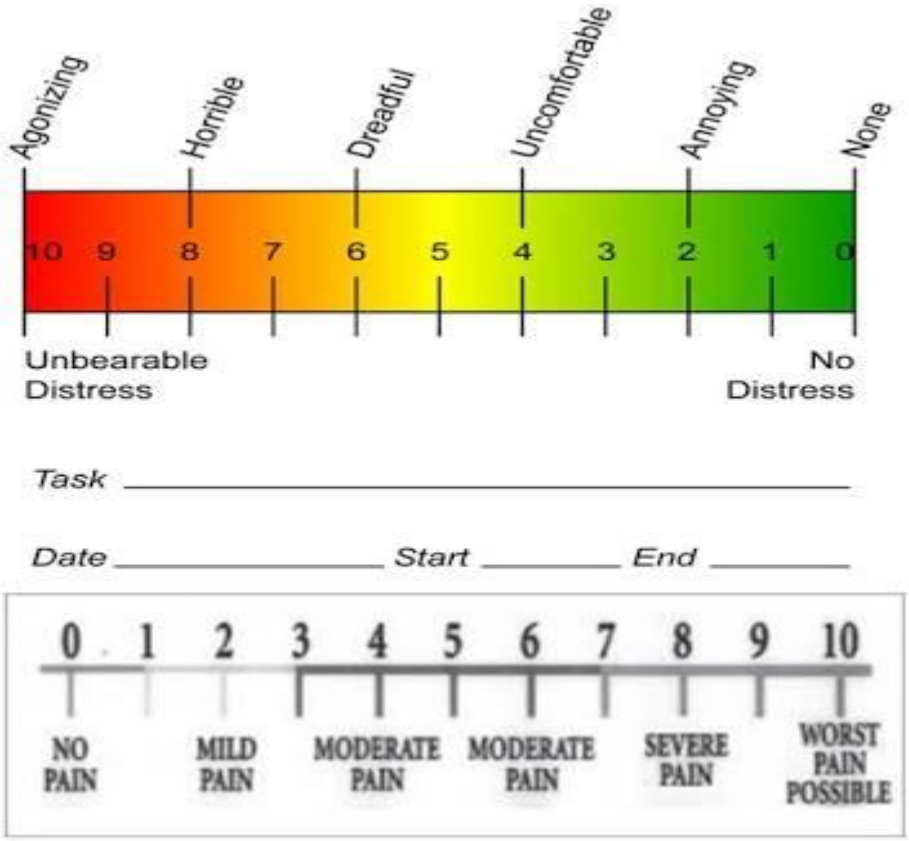
1. The reflex responses will b exaggerated and they have much lower threshold for pain sensitization then adults.

2. There will be less coordination in motor component of withdrawal reflex i.e. during withdrawal response there will be involvement of whole body movements.
3. The sensory neurons in the receptive fields which influences localization and discrimination are larger and there is great overlapping.
4. In early life central sensitization is done by ‘ A ’ delta fibers rather than ‘C’ fibers since maturity of this fibers takes place after birth and that too ‘ C ’ fiber much later than ‘A’ fiber.
5. At birth the peripheral inflammatory response is immature.

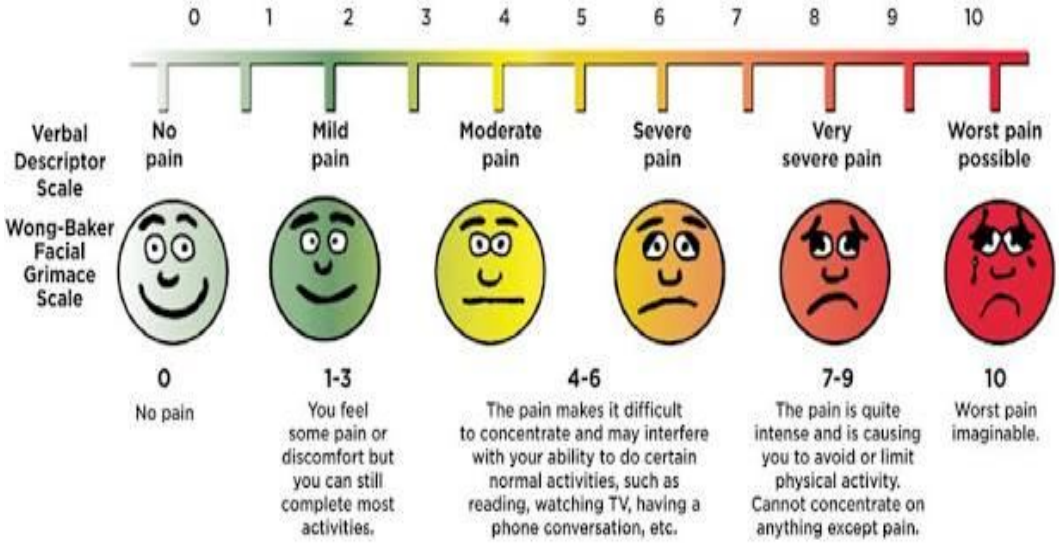
PAIN ASSESMENT IN CHILDREN:

The vast range of physiological and behavioral responses, cognitive abilities, physiological development from the period between the term neonate and adolescent poses enormous problems for valid and reliable measurement.

1) **Self report measures:**
    - VAS –VISUAL ANALOG SCALE



- FACES



Recommended Age: Children as young as 3 years.

2) OBSERVATIONAL BEHAVIOURAL MEASURMENTS

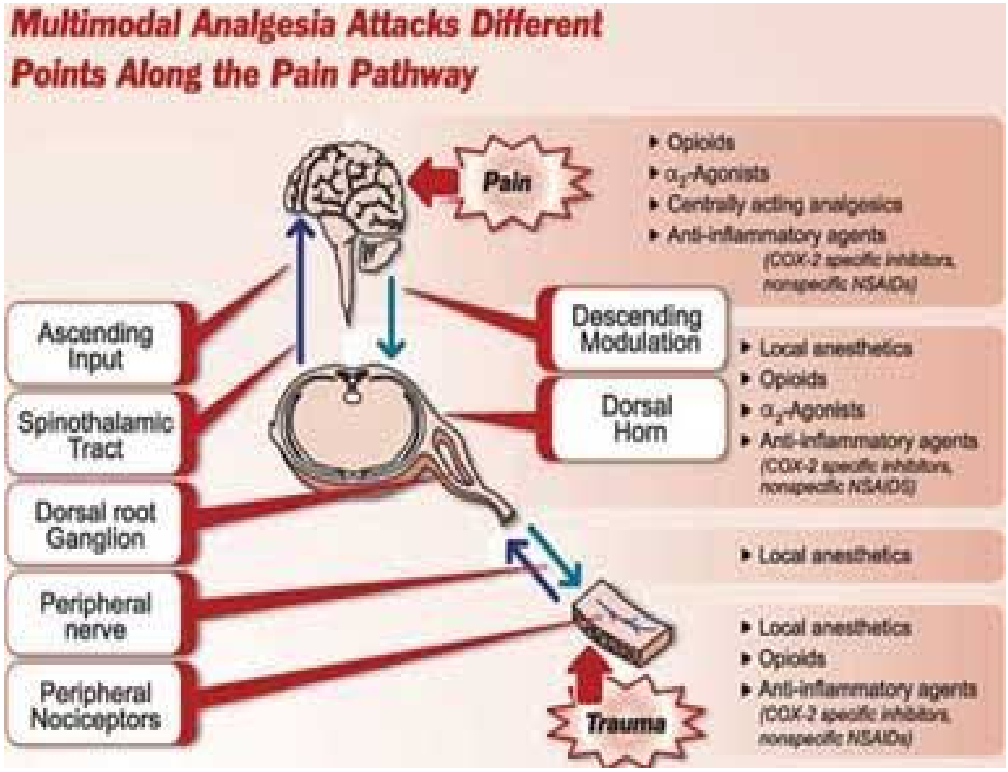
- FLACC- Faces, Legs ,Activity, Cry and Consol ability
- CHEOPS-Children Hospital Of Eastern Ontario Pain Scale
- CRIES-Crying Requires Increased Oxygen administration

  Increased vital signs Expression Sleeplessness
- COMFORT
- OBJECTIVE PAIN SCORE

FLACC behavioural pain score: Total 0 to 10

CRITERIA	SCORE 0	SCORE 1	SCORE 2
FACE	No particular Expression Or smile	Occasional grimace or Frown, withdrawn, Uninterested	Frequent to constant Quivering chin, clenched jaw
LEGS	Normal position Or Relaxed	Uneasy, restless, Tense	Kicking or legs drawn up
CRY	No cry(awake Or sleep)	Moans or Whimpers; Occasional complaint	Crying steadily, screams or sobs frequent complaints
ACTIVITY	Lying quietly, Normal position Moves easily	Squirming, shifting Back and forth tense	Arched, rigid, jerking
CONSOLABILITY	Content relaxed	Reassured by Occasional Touching, Hugging or Being talked To distractable	Difficult to console or comfort

Drugs acting at various sites of pain pathway:



- peripheral level –local anaesthetics , NSAIDS , opioids
- Spinal cord-opiods ,alpha 2 agonist , local anaesthetics
- Cortical level –opiods

For effective treatment of pain various combined modes of treatment are available. Among these methods regional anaesthesia provides efficient pain relief and has several advantages over other methods which are as follows

1) Analgesia provided by regional block reduces general anaesthesia requirement ,resulting in :

    1. More rapid recovery
    2. Decreased postoperative opioid requirement
    3. Early return of appetite
    4. Reduced incidence of PONV
    5. Early discharge

2) Regional block avoids undesirable autonomic reflexes like

    1. Laryngospasm
    2. Cardiac dysarhythamias

3) Muscle relaxation is adequate in regional anaesthesia-

Use of muscle relaxant avoided ,decreased risk of respiratory insufficiency

4) After delicate surgery immobilization of child is easier because of some residual blockade and adequate pain relief

5) Intra and post operative bleeding reduced

6) Diminished stress response

7) Greater cardiovascular stability

8) Fewer episodes of Hypoxia

9) Reduced need for postoperative ventilator support

10) Children are free from hypotensive response from sympathectomy produced by LA

11) REGIONAL ANAESTHESIA is the technique of choice in children with

- Malignant hyperthermia history
- Bronchopulmonary dysplasia

Anatomic &physiologic factors influencing regional block in children	
FACTORS	**ANAESTHETIC IMPLICATIONS**
Lower termination of spinal cord(L3-4)	Epidural approaches above L3 to be avoided whenever possible
Lower projection of Dural sac (S3-4)	Increased risk of inadvertent penetration of Dura matter.
Delayed myelinization of nerve fibers	Intramural penetration of local anaesthesias is easier Onset time shortened Diluted local anaesthesias is effective as more concentrated anaesthesia
Cartilaginous structure of bones and vertebrae	Danger of direct trauma Use short and short beveled needles
Changing axis of coccyx and absence growth of sacral hiatus	Identification of sacral hiatus difficult above 6-8 years Increased failure rate of caudal anaesthesia
Delayed ossification of and growth of iliac crests	Tuffier's line passes over L5- S1 interspaces.
Increased fluidity of epidural	Increased diffusion of local

fat	anaesthesia up to 6 -7 years of age with excellent caudal blockade
Loose attachment of sheaths and aponeurosis to underlying structures	Larger volume of local anaesthesias for epidural blocks due to leakage along spinal nerve roots
Sympathetic immaturity ,diminished autonomic adaptability of heart ,smaller vascular bed in lower extremities	Hemodynamic stability during neuraxial blocks Fluid preloading and use of vasoactive agents not needed
Low plasma protein content	Increased unbound free fraction of all local anaesthetics ;greater danger of systemic toxicity
Increased heart rate and cardiac output	Increased regional blood flow and increased absorbtion of LA;shorter duration of action
Enzymatic immaturity	Slower metabolism of LA with risk of accumulation
Increased extracellular fluids	Increased distribution volume of LA with increased risk of accumulation after continuous infusion
Absorption from epidural space	Time (Tmax) to reach peak plasma concentration remains basically unchanged
Metabolism	Low plasma cholinesterase activity Decreased cytchorme P450 activity

	Phase 2reactions immature up to3 years of age
Elimination half life	>1 year: same as adults <1 year: increased thus favoring accumulation with repeated injections
Systemic toxicity	Thresholds of toxicity of the unbound form of LA:0.3 microgram/ml for Bupivacaine

AIM OF STUDY

This study compares the efficacy of ultrasound guided Transversus Abdominis Plane block and Caudal epidural block for post operative pain relief in children undergoing elective lower abdominal surgeries.

TAP BLOCK

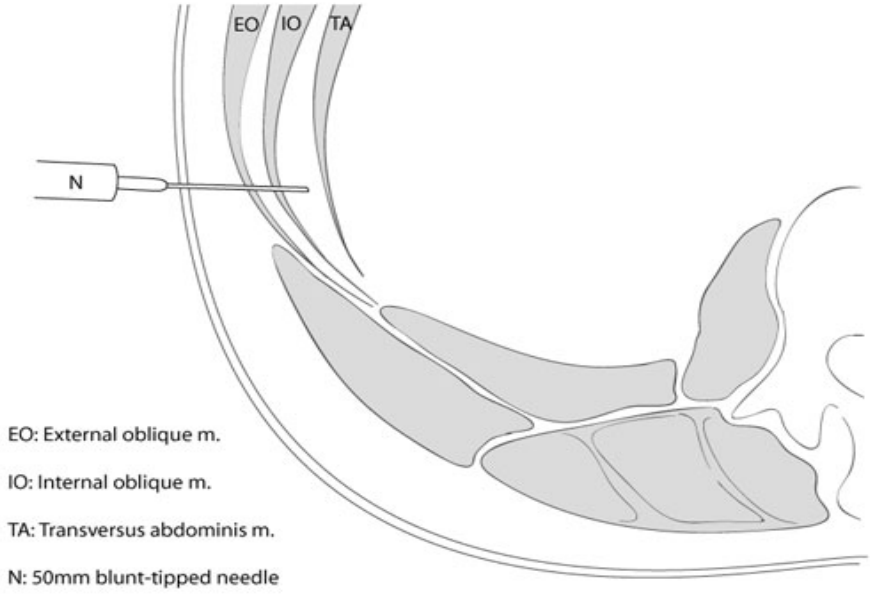
Transversus abdominis plane block is a regional anaesthesia technique that provides analgesia to the parietal peritoneum as well as the skin and muscles of the anterior abdominal wall.

HISTORY

- Tap block was first described by RAFI in 2001.
- He approached transverses abdominis plane by utilizing surface anatomical landmarks, the lumbar triangle of Petit.
- Lumbar triangle of petit enclosed medially by external oblique, posteriorly by lattismus dorsi and laterally by the iliac crest.
- In 2004, TAP blocks were presented in cadavers and in healthy volunteers at scientific meeting and American Society of Anaesthetists by Mc Donell et al.

ANATOMY

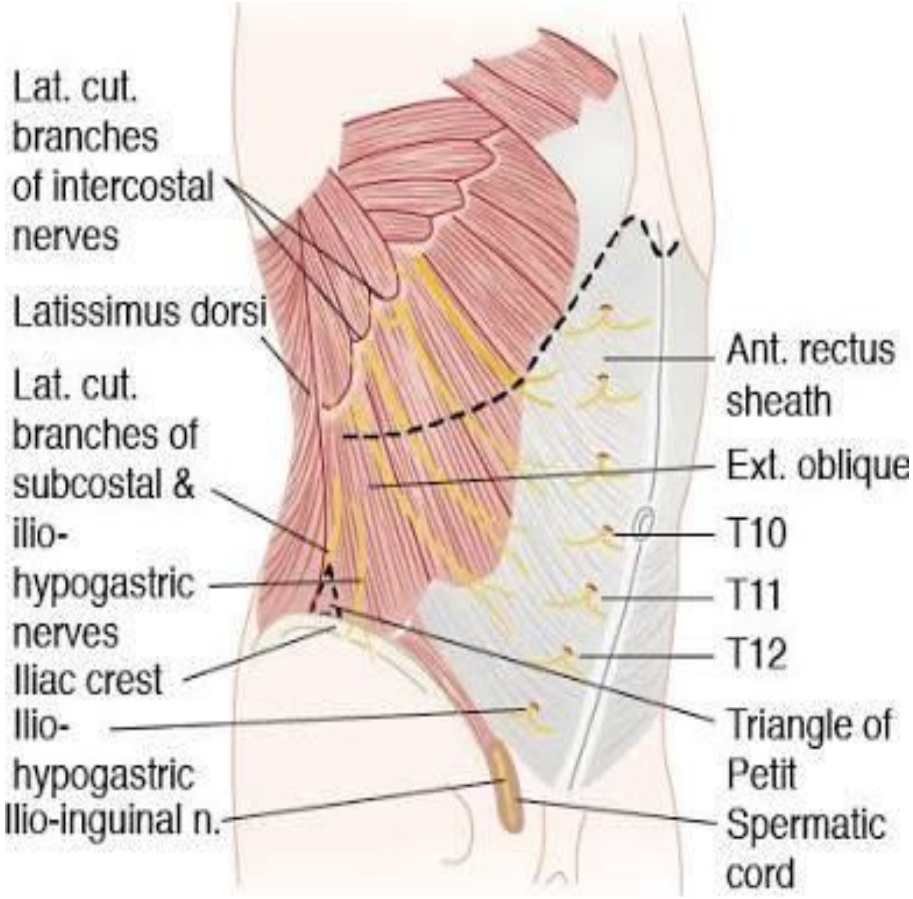
- Lateral abdominal wall musculature has three layers.
- From superficial to deep they are external oblique, the internal oblique and the transversus abdominis muscle.



- ❖ Transversus abdominis plane is the facial layer between the internal oblique and the transverses abdominis muscles.
- ❖ Anterior rami of thoracolumbar nerves that innervate the anterior abdominal wall pass through this plane as small, but well defined neuromuscular bundles.

Nerve supply of anterior abdominal wall

The lower 6 thoracic nerves (T6-T12) and the first lumbar (4) supply sensation to the abdominal wall.



Thoracic Nerves (T6-T11)

The anterior division and nerves from T6-T11 travel along their relevant intercostals space, before passing under the costal cartilages. They enter into the facial plane between transversus abdominis and internal oblique.

They continue on the pierce the rectus abdominis muscle terminating as the anterior cutaneous branches supplying sensation to skin and the anterior abdominal wall.

The Thoracic Nerve (T6-T11) gives off lateral cutaneous branches, half way along their course, piercing the external oblique muscle to supply sensation to skin of the lateral abdomen cord balk.

Thoracic Nerve (T12)

The anterior division of the nerve from T12 is a large nerve.

It runs anteriorly along the inferior border and the 12^{th} nerve and passes under lumbocostal arch to run along with other lower intercostals nerve between transversus abdominis muscle and the internal oblique muscle.

The T12 nerves gives a communicating branch to L1 nerves as part of upper part of lumbar plexus.

The lateral cutaneous branch of T12 supplies the skin over the upper gluteal region.

The ilioinguinal and iliohypogastric nerves (T12/L1).

The iliohypogastric and ilioinguinal nerves of the lumbar plexus both enter the transverse abdominis plane near to the iliac crest. The iliohypogastric divides into anterior cutaneous branch, supplying the skin over the hypogastrium, and a lateral cutaneous branch supplying skin over the gluteal region.

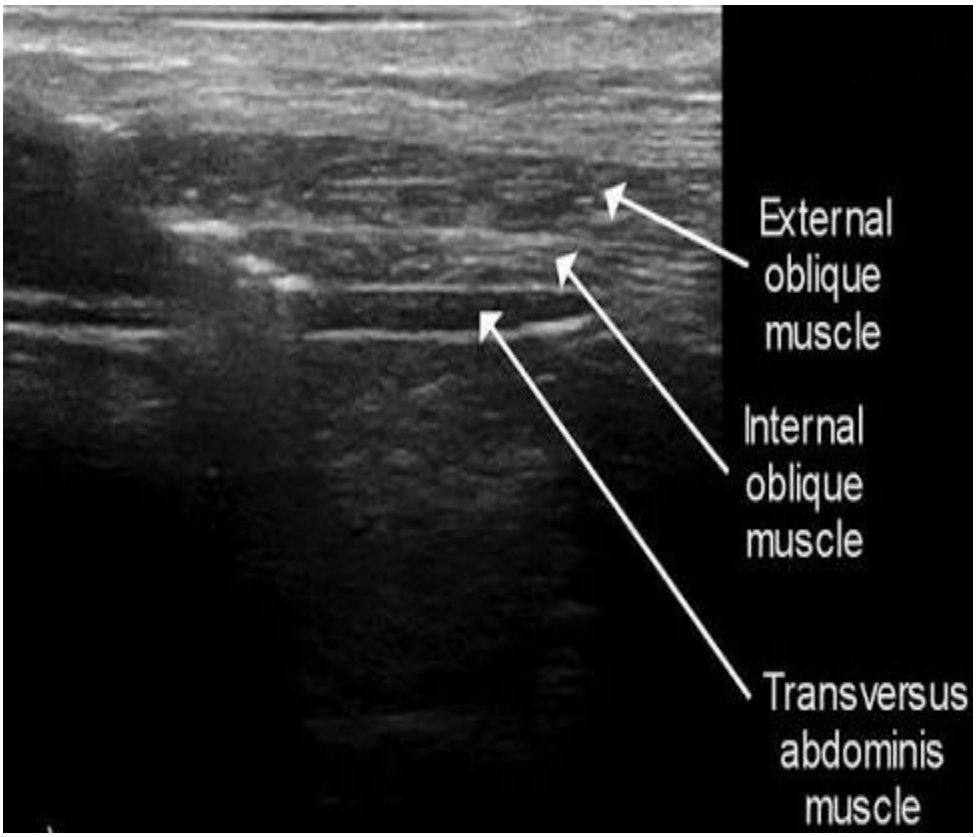
The ilioinguinal nerves supplies sensation to the skin of the upper thigh base of penis and scrotum as it travels with in inguinal canal.

TECHNIQUE

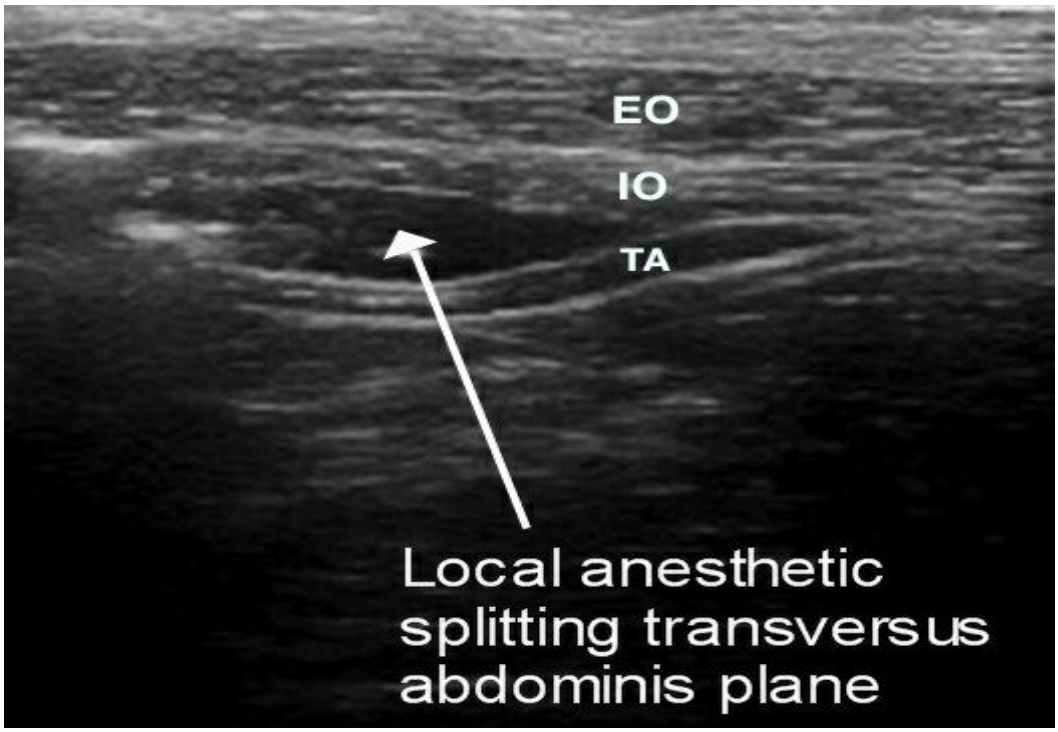
Ultrasound Guided Approach

An ultrasound guided approach was first described in 2007 by Hebbard et al.

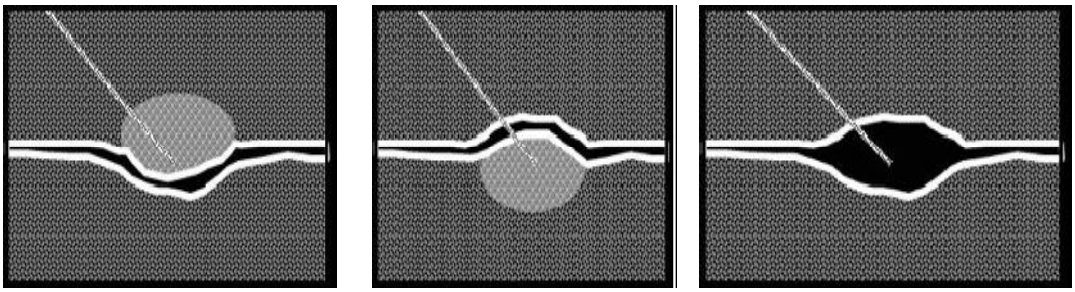
The ultrasound probe is applied transversely to the anterolateral abdominal wall, where the three muscles layers are most distinct.



After identification of transversus abdominis plane between internal oblique and transversus abdominis muscle, the block needle was then introduced anteriorly and advanced in an ‘in plane’ approach.



A hypoechoic layer created by injection of local anaesthetics, is easily visualized.



CAUDAL ANAESTHESIA

It is the oldest and still most commonly used form of regional technique in children.

HISTORY

1) Cathelin and Sicard-first described' this technique in 1907.

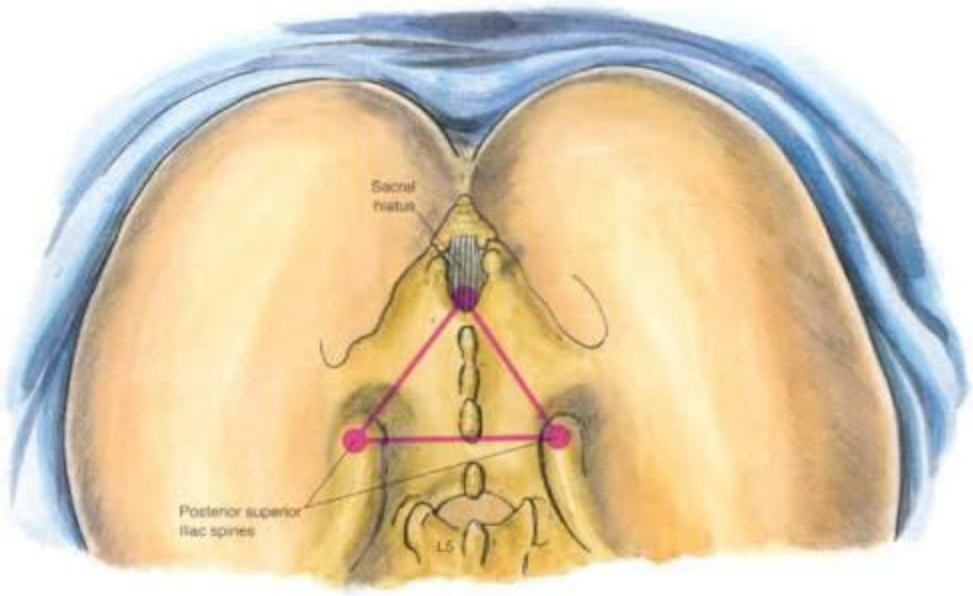
2) Steckel of Germany-first used this technique in 1909.

3) Meeher and Bonar-first used this technique in obstetrics and Gynecology in 1923.

4) Edwards & Hingson-developed continuous caudal technique in 1942.

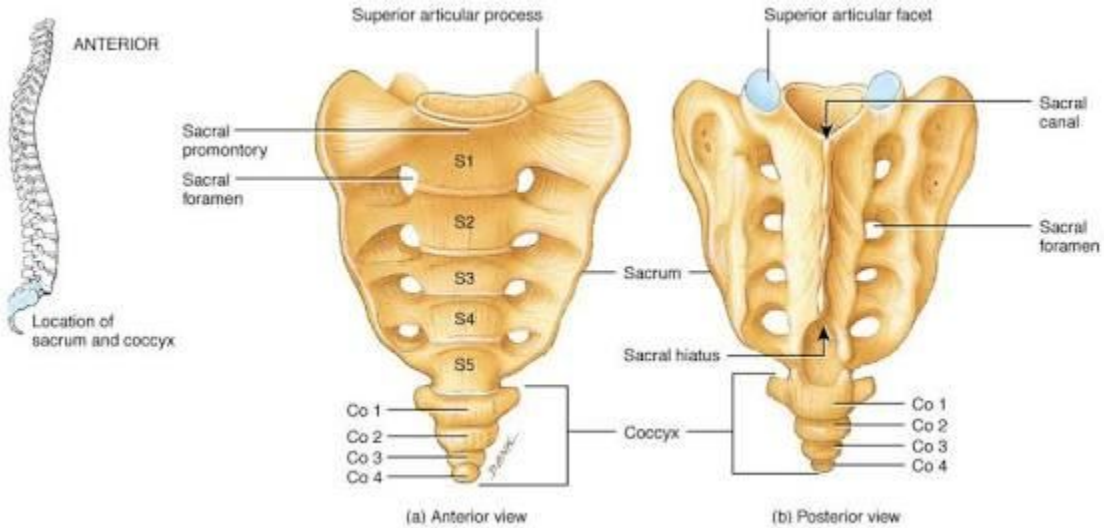
ANATOMY OF CAUDAL BLOCK:

Caudal block is performed via sacral hiatus through sacrococcygeal membrane. The posterior superior iliac spines and sacral hiatus form an equilateral triangle.



SACRAL HIATUS

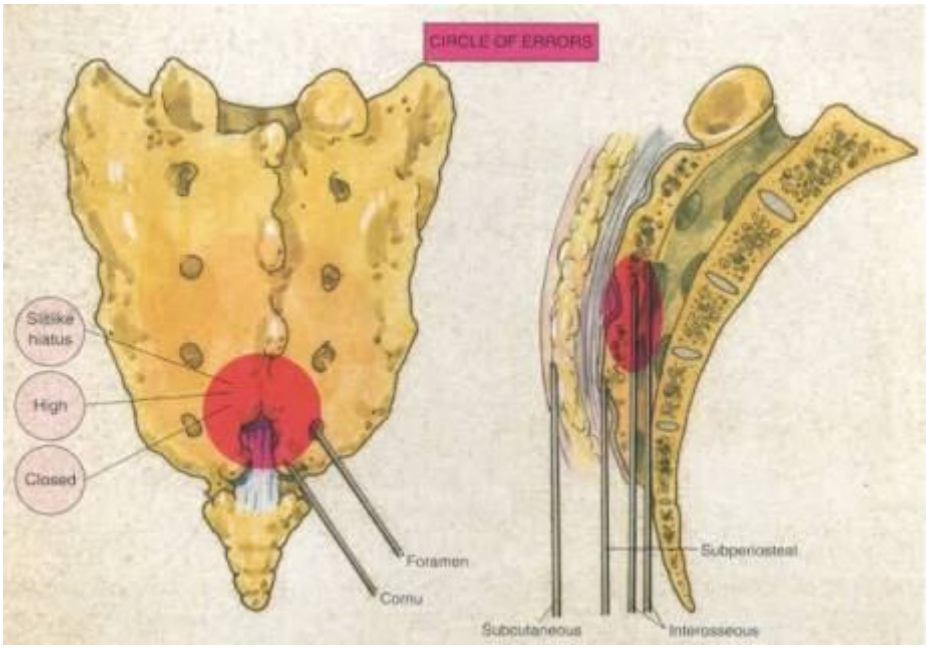
Sacral hiatus is a bony defect, triangular in shape and situated at the lower end of sacrum just above sacrococcygeal junction. It results from the non fusion of the 5th sacral and sometimes 4th sacral vertebral arches.



It appears as an inverted U or V shaped opening limited laterally by two palpable bony structures, the sacral cornu and covered by sacrococcygeal membrane (continuation of ligamentum flavum sacrally) which lies beneath skin and subcutaneous tissue. The shape and size of hiatus changes with increasing age.

In neonate long axis of sacrum and coccyx form an acute angle. As age increases,angle increases and thus close the sacral hiatus and makes caudal anaesthesia more difficult to perform after l7yrs of age.

The caudal epidural space in a neonate is filled with epidural fat, which has a gelatinous, spongy appearance with distinct spaces between the fat globules and very few connective tissue fibers, so uniform and rapid spread of local anaesthesia solutions occur.



After 6 to 7 years of age, the epidural fat gets denser and surrounded by fibrous strands thereby spread of local anaesthesia is limited.

Caudal epidural space is highly vascularised like lumbar epidural space and the veins here are without valves and thus inadvertent intravascular injection leads to systemic toxicity.

The characteristic of caudal epidural space is that it communicates freely with Intraneural space. This facilitates improved quality of block even with dilute local anaesthetic solutions in large volumes.

Age and weight of patient influence the distance between epidural space and skin.

The mean distance from skin to sacral epidural space in children aged >2 months & <7 years is 21 mm.

The distance from apex of sacral hiatus to Dural sac in children> 10 month & <18 years is 30+/10.4mm. So a short (i.e.25mm length) and short beveled needle is adequate to reach the sacral epidural space and prevent inadvertent dural puncture.

INDICATION:

1) Surgeries below the diaphragm especially in sacral &lumbar areas e.g. orthopedic procedures on lower limb and pelvic girdle.

2) Lower abdominal surgeries e.g., urinary and lower digestive tract surgeries and

3) As sole anaesthesia technique in fully awake ex-premature infants younger than 60 weeks of post conceptual age.

CONTRAINDICATION

- ❖ Infection at the local site

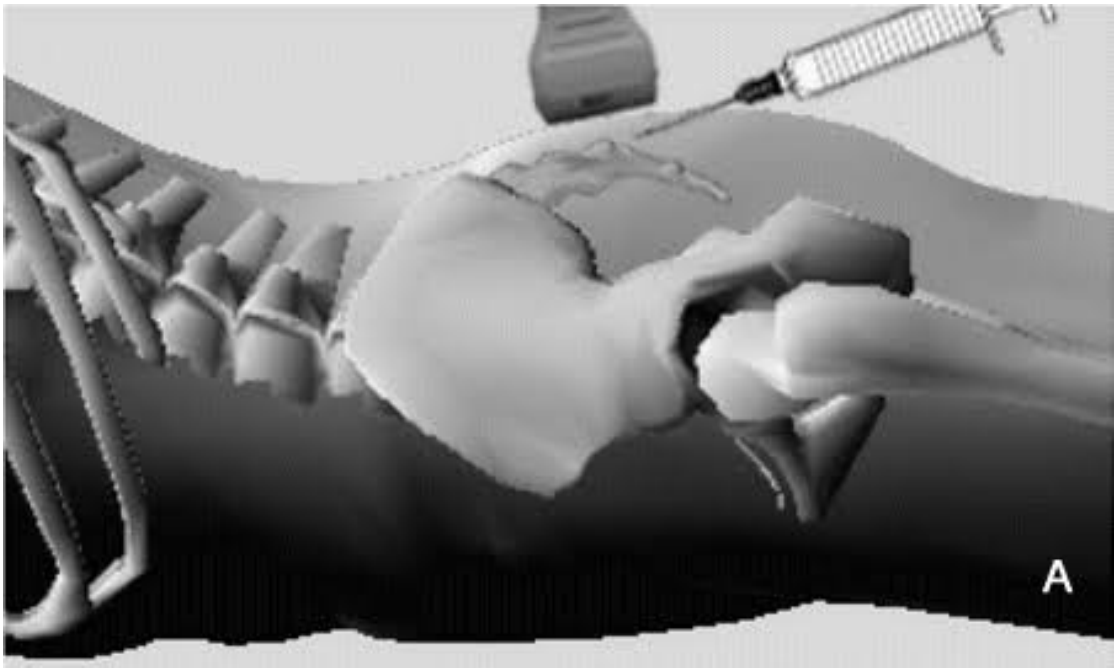
- ❖ Bleeding diathesis
- ❖ Sacral malformation
- ❖ Raised intracranial pressure
- ❖ Meningitis

TECHNIQUE

All equipments including block tray, resuscitation equipment and suction are kept ready.

POSITIONING

The child is placed in lateral Sims position, left side down for right handed person with the lower leg slightly flexed at the hip and upper leg more flexed such that it lies over and above the lower leg and in contact with bed. This maneuver separates the buttocks. This is the preferred position.



OTHER POSITIONS

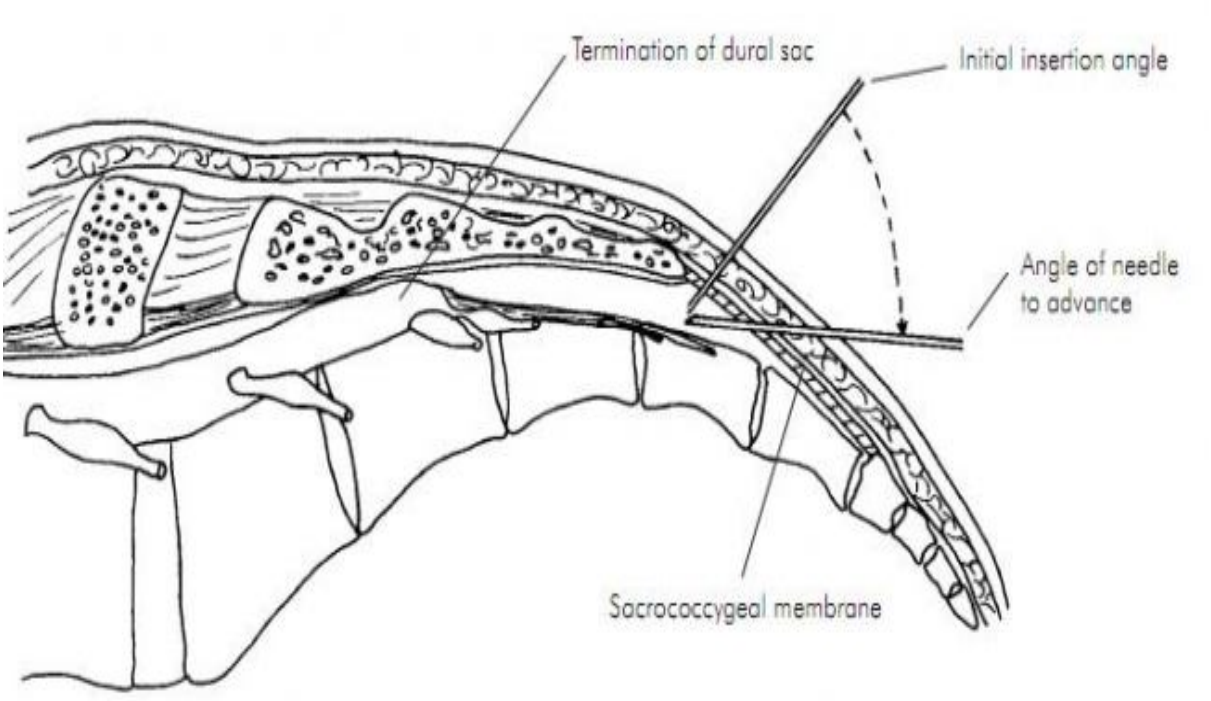
2) Prone position with pillow under the pelvis. Both legs are rotated so that the toes of both feet are facing medially, this again separates the buttocks.

The sacral hiatus is identified by means of shallow (U or V) depression and 22 G short beveled needle is inserted at an angle of

60 degree at the apex of hiatus until a distinct pop is felt. The pop is felt as the needle penetrates sacrococcygeal ligament.

The needle is inserted at the apex of hiatus because it is the deepest part of sacral canal and so that the entire bevel of the needle is within the canal.

A longer bevel may be partly outside the canal or may traumatize a vessel or periosteum as it is advanced.



The needle both hub and shank, is then depressed toward the skin so that the needle aligns approx. in the long axis of canal and then inserted further.

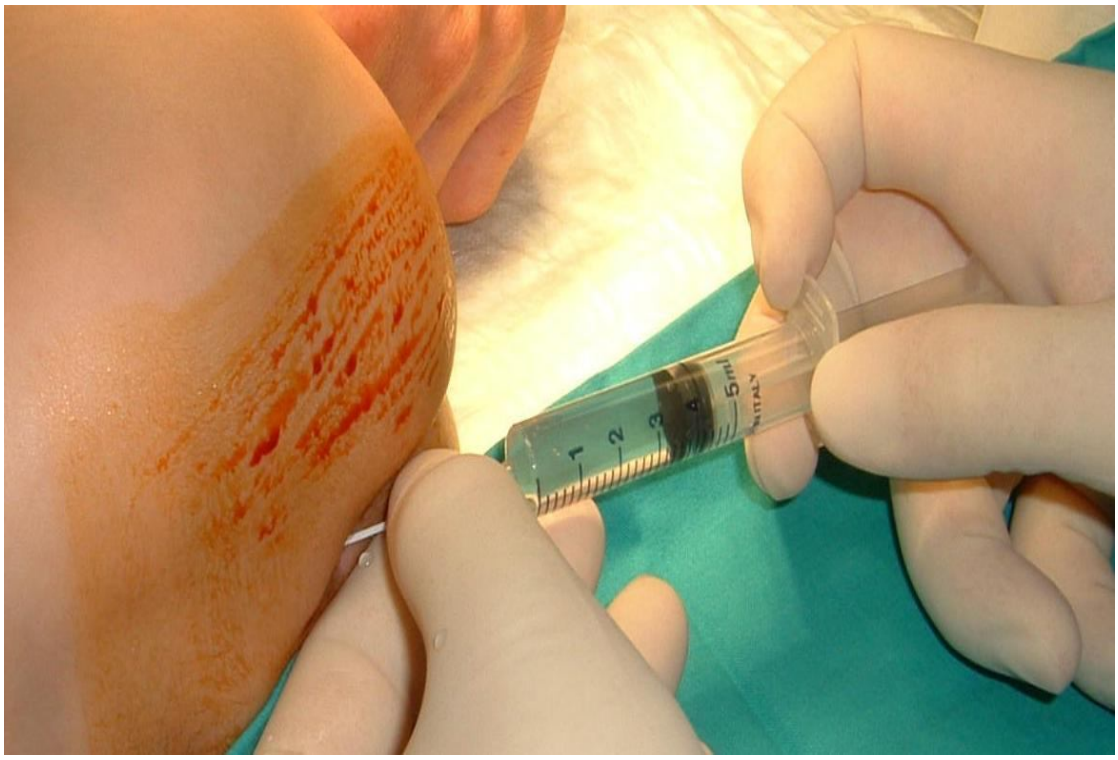
The needle is stabilized and after negative aspiration for blood and CSF, the drug is administered in small volumes with repeated aspiration.

At the time of drug administration ECG is carefully observed (for doubling in size of T wave or tachycardia) as a sign of intravascular injection.

SIGNS OF CORRECT NEEDLE PLACEMENT:

- ❖ No CSF, air ,blood on aspiration
- ❖ No subcutaneous bulge or superficial crepitus after injection of 2 3m1 of local anaesthesia
- ❖ No tissue resistance to injection
- ❖ Needle should be able to move in the canal
- ❖ No local pain during injection
- ❖ Whoosh test-Inject 2 to 4m1 of air and listen with ear or stethoscope over lumbar region. Not done nowadays

❖ If catheter is inserted, it should enter the canal freel



SELECTION OF DRUG:

The drug dosage for caudal epidural blockade depends on two factors:

1) Volume of local anaesthesias (not the concentration)

2) Volume of epidural space which varies with age.

Dosage calculation is based on these two formulae mainly:

ARMITAGE'S FORMULA:

- O.5ml per kg-all sacral dermatomes are blocked
- 1 ml per kg-sacral and lumbar dermatomes are blocked
- 1 .25ml per kg-sacral, lumbar and lower thoracic dermatomes are blocked

TAKASAKI'S FORMULA:

Volume (ml) 0.O5ml per kg/dermatome to be blocked

Among these two, dosage of Armitage remains most dependable.

Takasaki gives best approximated clinical result.

The level of block depends on volume of drug given whereas density of blockade depends on the concentration of drug

COMPLICATIONS:

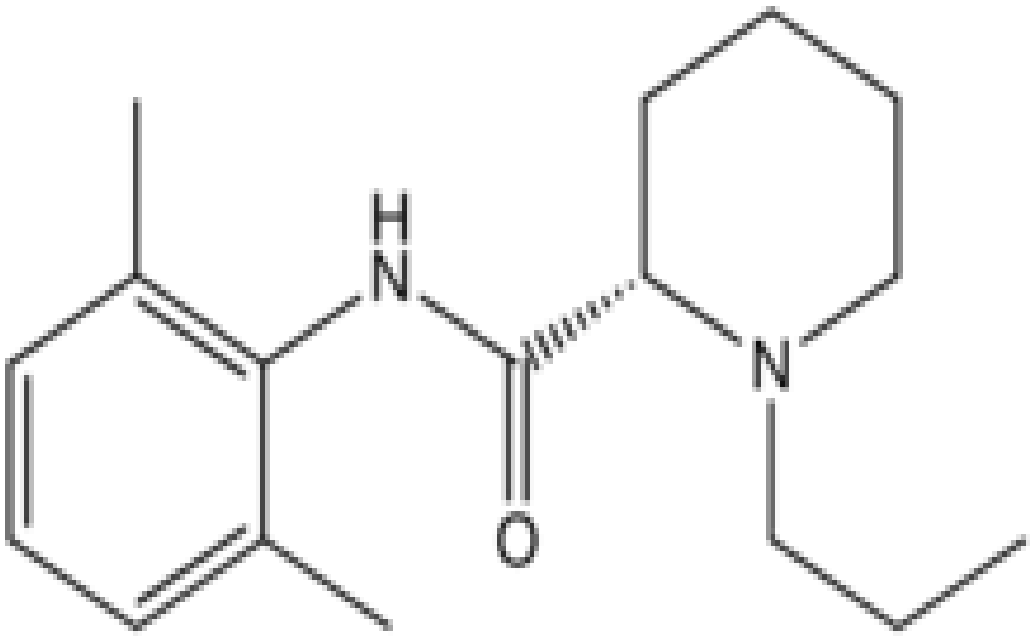
- Accidental intravascular or intra osseous injection
- Dural puncture
- Vascular injury leading to epidural hematoma

- Neural injury
- Infection-meningitis and epidural abscess
- Urinary retention
- Complete or partial failure of blocks
- Infection - It is of grave concern especially when it occurs either subarachnoid or the epidural space.
- Meningitis and epidural abscess are the most serious complication. The signs and symptoms are same for both except for fever, raised ESR and leucocytes count in epidural abscess. So whenever a child develops pyrexia of unknown origin with indwelling catheter, it is mandatory to remove the catheter immediately.
- Epidural hematoma — a very rare complication. Rapid diagnosis, immediate intervention and decompression give better outcomes.
- Urinary retention very rare can occur with use of opioids.
- Block failure rate is 3 to 5% and failure rate increases especially in children >7 years of age.

PHARMACOLOGY OF BUPIVACANE

Bupivacaine is an amide local anaesthesia agent. It was first synthesized by Ekenstam in 1957 and was first used clinically by widmon and Telimo in 1963 .It belongs to n-alkyl substituted pipecholyixylidines. It is produced as racemic mixture containing both S and R in equal proportion. It is supplied as a hydrochloride salt.

CHEMICAL STRUCTURE:



- Bupivacaine has a butyl group on the piperidine nitrogen atom of the molecule.

- It is a long acting local anaesthesia drug with high anaesthesia potency.
- It is more lipid soluble, highly protein bound and greater intrinsic potency
- It crosses the placenta and blood brain barrier.

PHYSIO-CHEMICAL PROFILE:

- Molecular weight-288
- pka-8.l
- Plasma protein binding-95%
- Partition coefficient -28(lipid solubility)
- Clearance-8.31/min
- Elimination t 1/2- 210min
- Elimination tl/2 in neonates & young infants-480-72Omin
- Umbilical vein-maternal arterial concentration ratio- 0.32

PHARMACOLOGICAL PROPERTIES:

- Onset - Moderate

- Potency - 4
- Duration - Long

MECHANISM OF ACTION:

Like all local anaesthetics it inhibits Na channels. It decreases or prevents large transient increase in permeability of the cell membranes to Na ions that causes depolarization of the membrane and thereby blocks nerve conduction. The permeability of resting nerve membrane to potassium ions as well as sodium ions are reduced and hence got a stabilizing action on all excitable membranes.

PHARMACOKINETICS:

- Rapidly absorbed from the site of injection
- Peak systemic concentration reached 5-30 min after administration
- Duration of action-360 to 720 minutes
- Dose dependent first pass pulmonary extraction occurs
- Metabolism in liver- dealkylation to pipecoloxylidine, aromatic hydroxylation
- Excretion-only 5% as unchanged drug and rest as metabolites

PREPARATION:

- O.25%,0.5% solutions in 10, 20ml vials respectively
- 0.5%(5mg/ml) bupivacaine with 80mg dextrose(to increase baricity)in 4ml ampoules for subarachnoid injection(baricity 1.0207)

MAXIMAL DOSE:

- 2.5mg/kg body weight and strength used is 0.25-0.75% with or without adrenaline. Adrenaline causes mild intensification and modest prolongation of blockade, but reduces its toxicity.

EFFECTS:

- Local-nerve blockade
- Regional-pain, temperature, touch, motor power and vasomotor tone are blocked
- Systemic effects-due to systemic absorption or accidental i.v. administration
- It is highly potent (4 times) more than lignocaine. Its duration of action longer.
- It produces differential sensory/motor blockade

ADVERSE EFFECTS:

- Central Nervous System : Toxicity produces
  - Circumoral numbness, metallic taste
  - Light headedness, dizziness, tinnitus
  - Confusion, slurred speech
  - Convulsions
- Cardio Vascular System: Effect is dose related
  - Depresses automaticity and contractility of heart
  - It decreases rapid phase of depolarization (v max) in purkinje fibers & ventricular muscle causes prolonged PR and QT interval
  - Re-entrant phenomenon and ventricular arrythymias can occur
  - Slow rate of recovery from use dependent blockade (Na
  - channels are blocked in fast in slow out manner)
  - Results mostly from high lipid solubility

- R-enantiomer is more toxic than S-enantiomer
- Pregnancy increases cardiotoxic effects of bupivacaine

ALLERIC REACTION:

Due to preservative methyl paraben

USES:

- Central neuroaxial blocks
- Peripheral nerve blockade
- For local infiltration subcutaneously

CONTRAINDICATION:

- Known hypersensitivity to amide local anaesthetics
- Intravenous regional anaesthesia

REVIEW OF LITRATURE

❖ DALIA M. FAWY et al 2013[8]

They compared the analgesic efficacy of Transverse Abdominis Plan block vs Caudal block for postoperative pain relief in children undergoing Lower abdominal surgeries. They selected 39 patients and divided them in to two groups. Group A with 20 patients received ultrasound guided TAP BLOCK using 0.3 ml/kg of 0.25 % Bupivacine. Group B with 19 patients received CAUDAL BLOCK using 1.25 ml /kg of 0.25 % Bupivacine. All patients after induction with sevoflurane with oxygen anaesthesia, were divided randomly in to two groups and given Caudal and TAP block respectively. Child was monitored for intra operative and post operative vitals like heart rate, respiratory rate ,blood pressure and oxygen saturation. Post operative pain relief assessed by FLACC pain score. The duration of analgesia and the total doses of rescue analgesia in first 24 hours were compared in all cases. The child with a pain score of >3 received i.v aceteminophine in a dose related body weight basis. There was a statistically significant difference between two groups. The time for first rescue analgesia was longer in TAP block group. They also observed that there is no significant difference between two groups with respect to intra operative hemodynamic variables.

❖ PALETI SOPHIA et al[21]

50 Children of ASA PS 1 AND 2 who undergoing lower abdominal surgeries were randomized in to group A and B of 25 each. All patients received general anaesthesia standard monitoring. In group A TAP block was given with 2.5 mg /kg of 0.5 % ropivacine. In Group B , standard systemic analgesia was given. In addition both the group received iv paracetamol 15 mg /kg immediately after completion of surgery. Intra operative hemodynamics were monitored in both groups. Postoperative pain in both the groups were assessed using Visual Analogue Score, 4 Point Sedation Scale and PONV using Numerical Rank Score. Assessments were made immediately after surgery ,1hr ,2hr, 4hr, 6hr and 24 hr after surgery. If post operative pain score is >3, Tramodal 1 mg /kg was given as rescue analgesia. Time to 1st dose of rescue analgesia, total tramodal dose and post operative VAS score were analysed. They concluded that there is no significant difference in the hemodynamic parameters in both the groups intra operatively .In TAP block group VAS score was reduced and incidence of PONV is low.

❖ D.J. SANDEMAN et al [7]

They did a study on 93 children aged 7 to 16 undergoing Laparoscopic Appendicectomy. They were randomized in to two groups receiving TAP block(Group A) and another group not receiving TAP block(Group B). All patients in group B were given port site infiltration with ropivacine and were prescribed I.V Patient Controlled Analgesia with Morphine and oral paracetomal for postoperative pain relief .They observed proportion of patients receiving >200 microgram Morphine. They observed a statistical difference in pain scores between two groups. They concluded the study that TAP Block increases the analgesia time by 14min on an average.

❖ WAFAA M.AL SADEK et al: [26]

They did a study on 108 children 3-7 years who were randomly allocated in two groups .Group A received TAP Block with 0.5 ml / kg of ropivacine 0.375 % bilaterally under ultrasound guidance. Group B received regular analgesics. All children received general anaesthesia. Quality of analgesia assessed using Children's Hospital Eastern Ontario Pain Scale (CHEOPS) and Objective Behavioral Pain Score (OPS) .Intra operative

hemodynamics and degree of pain were compared. They also compared intra operative fentanyl requirement, post operative rescue analgesia (time and dose), complications and hospital stay.

They concluded the study that TAP Block group had significantly lower intra operative fentanyl requirement, significantly lower time to first post operative analgesia and lower pain scores.

- ANN AND ROBERT et al[3]

In this study they compared the efficacy of TAP Block using 2 different concentrations of bupivacine for post operative pain relief.36 students of age under 8 years who were undergoing hernia repair ,hydrocele and lower abdominal surgeries randomly divided in to two groups .They followed the patients for duration of surgery and post operative pain relief for 48 hrs. Post operative Pain relief measured using FLACC pain score every 5 min for 1 hr postoperatively. Vital signs like Blood pressure ,Heart rate ,SpO2 and respiratory rate were also compared. Time of rescue analgesia and dose were noted and compared. They concluded the study that TAP BLOCK is easy to perform and it provides adequate analgesia postoperatively then usual analgesics in children undergoing lower abdominal surgeries.

levobupivacine 0.5% .Postoperative pain relief was assessed by Visual Analogue Score (VAS) post operatively for 48 hrs and also at 3 months and 6 months. Pain at 6 months were assessed by using a questionnaire for neuropathic pain .Postoperative Morphine requirement in two groups were also recorded.

- AHAMED M.FARIED et al [(1)]

In this study they compared the analgesic efficacy of Ultrasound guided TAP block vs Ilioinguinal nerve block.60 children undergoing unilateral lower abdominal surgeries were randomized in to two groups and were allocated to receive USG guided TAP block and Ilioinguinal nerve block respectively. Group A received 0.5 ml / kg of 0.25% bupivacine and group B received 0.1 ml / kg of 0.25 % bupivacine. Postoperative pain assessed by using Children Hospital Eastern Ontario Pain Scale
(CHEOPS) scoring system .Time for first dose of rescue analgesia and number of doses of rescue analgesia were noted.

The study concluded that there is no significant difference in two groups. The average pain score postoperatively at 240 minutes is reduced in TAP block group then ilioinguinal nerve block group .Hence the author concluded TAP block is an regional anaesthesia technique that provided post operative pain relief for longer duration as compared to ilioinguinal nerve block.

❖ WAFER MOHAMED ALSADEK et al : [27]

USG Guided TAP block vs USG guided caudal block for pain relief in children undergoing Lower abdominal surgery. They selected 60 patients randomly and divided them in to 3 groups .

Group A - Received TAP Block under USG Guidance.

Group B - Received Caudal Block under USG Guidance.

Group C – Received conventional analgesia.

Intra operative and Postoperative hemodynamics were observed in each group .The analgesic efficacy in each group is compared using Children's Hospital Eastern Ontario Pain Scale (CHEOPS) Scoring system and Objective Pain Score. Postoperative analgesia requirement was also noted in each group.

The results of this study was, there was no significant difference between three groups in Mean Arterial Pressure and Heart rate. Postoperative analgesia requirement were significantly higher in group B compared to group A, meanwhile it was significantly higher in group C .There was significant difference between group A and group C in pain assessment but not between group A and group B. Also, Patient and Parents satisfaction was more in group A.

❖ AHAMED RAMZY SHABHAN et al(4):

In this study they selected 44 children of age group 4 to 16 years, undergoing Laparoscopic Appendicectomy .They were randomly divided in to two groups, 22 each . Group A received TAP block with 0.4 ml / kg of 0.25 % Bupivacaine .Group B received Local anaesthesia infiltration . Two groups were compared on the basis of FACES pain score .Mean time to 1st analgesic requirement and number of doses of analgesic requirement was also calculated. They concluded the study that, FACES pain score was significantly lower in TAP block group. Also ,Mean time to 1st analgesic requirement is more in TAP block group. The number of doses of analgesic was significantly lower in TAP group.

❖ FREDRICKSON et al :(11)

They compared the effectiveness of TAP block and Ilioinguinal nerve block . Group A received TAP Block with 0.3 ml / kg of 0.1 % ropivacine .Group B received 0.1 ml /kg of 0.1 % Bupivacaine. Age appropriate pain score was assessed postoperatively . Total dose of Morphine requirement was also calculated. They concluded that Ilioinguinal nerve block is suIntraor then TAP block.

MATERIALS AND METHODS

This study was a randomized prospective double blind study. This was conducted after getting approval of institutional ethical committee and written informed consent of parents (or) guardians.

Sample Size Calculation

In my pilot study it has been observed that there is a significant decrease in the total dose of postoperative oral acetaminophen (301.9 ± 161.26 vs. 635.05 ± 205.42 mg) (P = 0.00) in unilateral TAP block group compared to single caudal block group with a difference of 47%.

Description:

• The confidence level is estimated at 95%

• with a z value of 1.96

• the confidence interval or margin of error is estimated at +/-15

• Assuming p% =47 and q%=53

$n = p\% \times q\% \times [z/e\%]^2$

$n= 47 \times 53 \times [1.96/15]^2$

n= 42.53

Therefore 44 is the minimum sample size required for the study(n=22 in intervention arm and n=22 in control arm)

In our study we have taken 46 as the sample size

(n=22 in Caudal Group and n=23 in TAP Block Group)

METHODOLOGY:

46 ASA status I (or) II patients aged 2 years to 8 years scheduled for elective lower abdominal surgeries. Patients who satisfied inclusion were controlled in this study. Criteria divided and randomly in to two groups.

Group-C: Caudal block

Group-T: Tap block

Inclusion Criteria

Age : 1 to 8 Years

Weight : 5 Kg to 20 Kg

ASA : 1 and 2

Surgery : Elective lower abdominal surgery

Exclusion Criteria

1) Children undergoing bilateral lower abdominal surgeries.

2) Children with altered sacral, caudal anatomy

3) Local infection at the site of block

4) Children with renal (or) hepatic insufficiency.

5) ASA III and IV

6) Known allergy to study drugs

7) H/o. developmental delay, neurological disease

8) Skeletal deformities

MATERIALS USED

- 22G, 24G intravenous cannula.
- Laryngoscope of various sized.
- 2 and 2.5 size laryngeal mask.
- Ringer's lactate ,Inj.Atropine, Inj.Ketamine, Inj.Ephedrine and other emergency drugs.
- Monitors ECG, NIBP, SPO2, temperature monitoring.
- 18G intravenous cannula
- Bupivacaine 20ml Vial 0.25%
- 2CC, 5CC and 10CC syringe.
- 7 to 12 MHZ linear ultrasound probe.

PRIMARY PARAMETERS

- Duration of analgesia
- Time for requirement of rescue analgesia

SECONDARY PARAMETERS

- FLACC pain score
- Intra operative and post operative hemodynamics
- Heart rate
- Systolic, Diastolic and mean blood pressure
- SpO2
- Any adverse effect.

METHODOLOGY OF STUDY:

This study was done at the Department of Anaesthesia, Institute of Child Health and Hospital for Children between June and July of 2015. The aim of the study was to compare efficacy of Ultrasound guided Transversus Abdominis Plane (TAP) block and caudal epidural block for postoperative pain relief in children undergoing lower abdominal surgeries.

46 children between the age group 1 to 8 years scheduled for elective lower abdominal and genitourinary surgeries were randomly divided in to two groups for study using computerized program.

Group-C received caudal epidural block with 1ml per Kg of 0.25% Bupivacaine.

Group-T received ultrasound guided Transversus Abdominis Plane block with 0.3ml/ kg of 0.25% Bupivacaine.

The age and weight of child was recorded preoperative fasting protocols were strictly adhered to after obtaining patients weight and age, appropriate size laryngeal mask airway was kept ready and the volume to be injected in caudal block and

Transversus abdominis plane block was prepared in syringes under strict aseptic precautions.

All patients were premedicated with Inj. midazolam 0.4mg/Kg orally 15-20 min before anaesthetic induction.

Patients were monitored using standard monitoring (heart rate, non-invasive blood pressure, and pulse oximetery).

Heart rate and mean arterial blood pressure systolic blood pressure and diastolic pressure were recorded before induction and every 5 minutes until the end of surgery.

All patients were induced with 8% sevoflurane in 50% O2 and 50% N2O through Jackson- Rees modification of Ayre's T piece with appropriate size face mask.

A 22G intravenous cannula was inserted. After securing intravenous cannula, Inj.Propofol 2mg/Kg, Inj.Atropine 0.01mg/Kg and Inj.ketamine 1mg/Kg was given. Appropriate size LMA(2 and 2.5) was inserted. Anaesthesia maintained with 2 %sevoflurane, delivered in 50% O2 and 50% N2O.

Group-C patients were placed in lateral decubitus position and a single dose caudal block by 0.25% Bupivacaine ,1ml/Kg was

performed under sterile conditions using a 23GG needle using a standard loss of resistance technique.

Patients in Group T were placed in supine position and TAP block was performed under ultrasound guidance.

The linear ultrasound probe connected to a portable ultrasound unit was placed in mid auxiliary level in the transverse plane to the lateral abdominal wall midway between the lower costal margin and the highest part of iliac crest.

A 18G needle attached with syringe fixed with 0.25% Bupivacaine (0.3ml/Kg) was inserted in plane with the ultrasound probe and advanced until it reached the plane between transversus abdominis and internal oblique muscle, after careful aspiration to exclude vascular puncture, the local anaesthetic solution was injected, leading to separation between the internal oblique and transversus abdominis muscle, which appeared as a hypo echoic space in ultrasound.

Skin incision was made 10 min after administration of caudal (or) TAP block. An increase in heart rate and mean arterial pressure (>20%) with incision compared with baseline values, 10 min after

administration of caudal (or) TAP block analgesia was defined as failed blockage.

1. patient with failed caudal blockage was given Fentanyl 1µg/Kg intravenously and was excluded from study.

Intra operative systolic blood pressure, diastolic blood pressure mean arterial pressure and heart rate were recorded every 5 minutes. Balanced salt solution was administered at the rate of 15-20ml/Kg.

After completion of the surgical procedure, laryngeal mask airway removed in deep plane and transferred to PACU (post anaesthesia care unit).

Using the Paediatric observational FLACC pain scale score with its 0-10 score range, postoperative FLACC pain score was assessed upon arrival and every 2 Hr for first 24Hrs.

If two coupled observations separated by a 5min waiting period. yielded FLACC pain scale score anytime to be more than 3, rescue analgesia with IV fentanyl 2µg/KG/dose was administered to achieve FLACC score of 3 (or) less.

The primary outcome measures were the time to first analgesia (in minutes from the time of caudal (or) TAP block injection to first registration of FLACC pain score >3.

Secondary outcome measures included FLACC Scale score and intra operative hemodynamic variables.

Complications like vomiting, urinary retention and respiratory depression etc are recorded.

Bradycardia was considered of heart rate less than 60/min and treated with Inj.Atropine, hypotension was considered if systolic blood pressure was below 70+/12 age in years with altered tissue perfusion and treated with fluid bolus. The respiratory depression was considered if SPO2 <95%.

All these children prior to discharge were examined for clinical education of neurological system.

OBSERVATION AND RESULTS

All statistical analysis as carried out using SPSS software for windows version 20.0.The results are expressed as mean and standard deviation. statistical analysis was carried out by student's t –test from parametric data like age ,weight, heart rate ,blood pressure. Then parametric data like type of surgery ,duration of surgery, post operative complications were analyzed using chi square test and fisher's exact test. A p value of <0.05 was considered as statistically significant.

Both the groups were comparable in terms of age, sex, weight, intra operative hemodynamics, post operative hemodynamics , FLACC pain score and Time for first rescue analgesia.

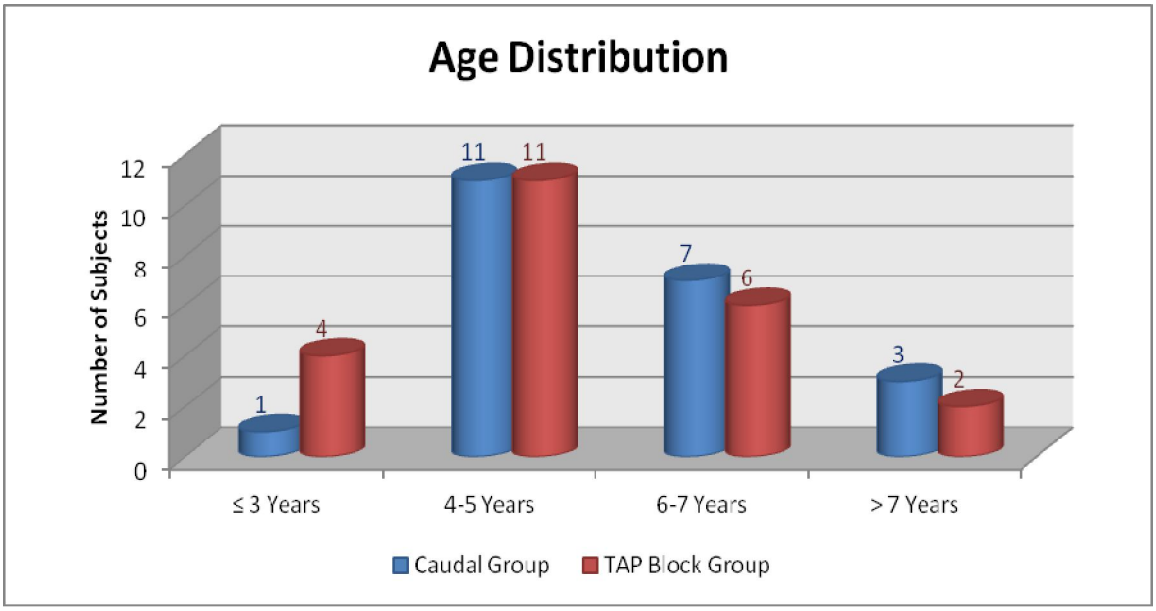
Statistics

Descriptive statistics was done for all data and suitable statistical tests of comparison were done. Continuous variables were analyzed with the unpaired t test and categorical variables were analyzed with the Chi-Square Test and Fisher Exact Test. Statistical significance was taken as $P < 0.05$. The data was analyzed using SPSS software and Microsoft Excel 2010.

GROUPS

Groups	Intervention Used	Study Subject
Caudal Group	• Caudal Epidural Block for Pain Relief	Children undergoing Lower abdominal surgeries
TAP block group	• Ultrasound guided Transversus Abdominis Plane Block	

AGE



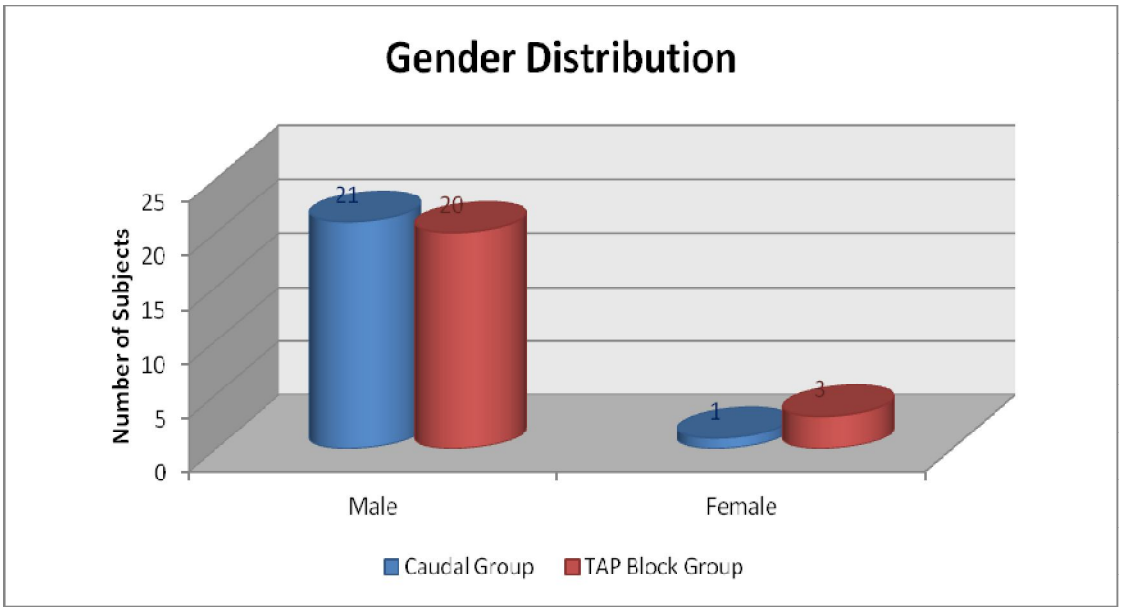
According to my study comparison of Age distribution between caudal group and TAP block group was not statistically significant.

Age Distribution	Caudal Group	%	TAP Block Group	%
≤ 3 Years	1	4.55	4	17.39
4-5 Years	11	50.00	11	47.83
6-7 Years	7	31.82	6	26.09
> 7 Years	3	13.64	2	8.70
Total	22	100	23	100

Age Distribution	Caudal Group	TAP Block Group
N	22	23
Mean	5.64	5.02
SD	1.47	1.54
P value Unpaired t test		0.1773

Majority of the caudal group patients belonged to the 4-5 years age group (n=11, 50%) with a mean age of 5.64 years. In the TAP block group patients, majority belonged to the same age group as caudal group (n=11, 47.83%) with a mean age of 5.02 years. The association between the intervention groups and age distribution is considered to be not statistically significant since $p > 0.05$ as per 2 tail unpaired t test.

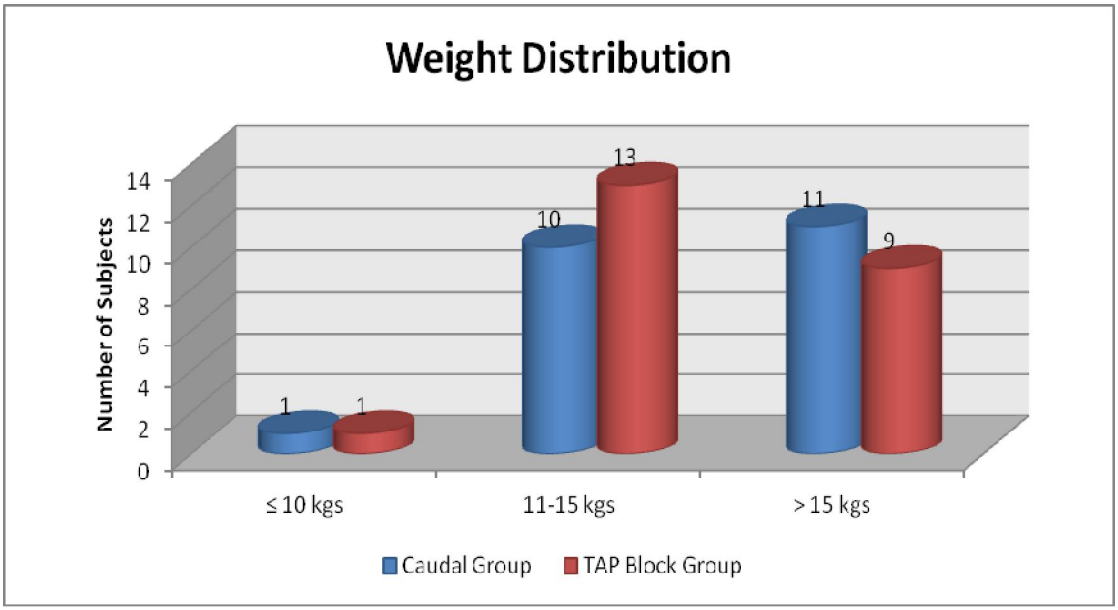
GENDER



Gender Distribution	Caudal Group		TAP Block Group	
Male	21	5.45	20	6.96
Female	1	.55	3	3.04
Total	22	00	23	00
P value Fishers Exact Test			0.6078	

Majority of the caudal group patients belonged to the male gender group (n=21, 95.45%). In the TAP block group patients, majority belonged to the male gender group (n=20, 86.96%). The association between the intervention groups and gender distribution is considered to be not statistically significant since $p > 0.05$ as per fishers exact test.

WEIGHT

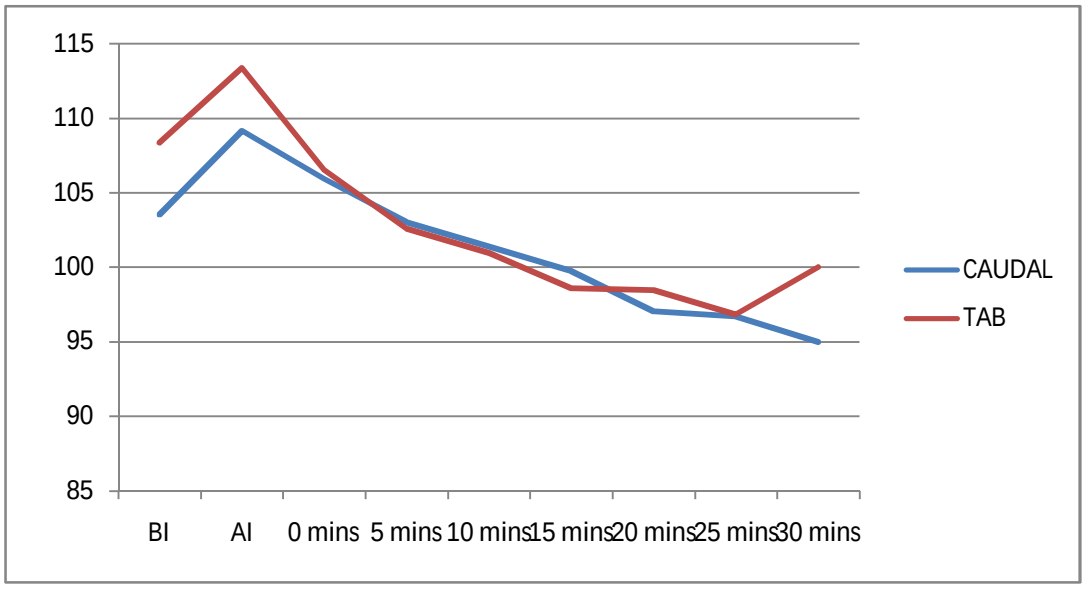


Weight Distribution	Caudal Group	%	TAP Block Group	
≤ 10 kgs	1	4.55		4.35
11-15 kgs	10	45.45	13	56.52
> 15 kgs	11	50.00		39.13
Total	22	100	23	100

Weight Distribution	Caudal Group	TAP Block Group
N	22	23
Mean	15.14	14.43
SD	1.88	2.00
P value Unpaired t test		0.2318

Majority of the caudal group patients belonged to the 11-15 kgs weight group (n=10, 45.45%) with a mean weight of 15.14 kgs. In the TAP block group patients, majority belonged to the same weight group as caudal group (n=13, 56.52%) with a mean weight of 14.43 kgs. The association between the intervention groups and weight distribution is considered to be not statistically significant since $p > 0.05$ as per unpaired t test.

INTRA OPERATIVE HEART RATE



According to my study comparison of intra operative heart rate between caudal group and TAP block group was not statistically significant.

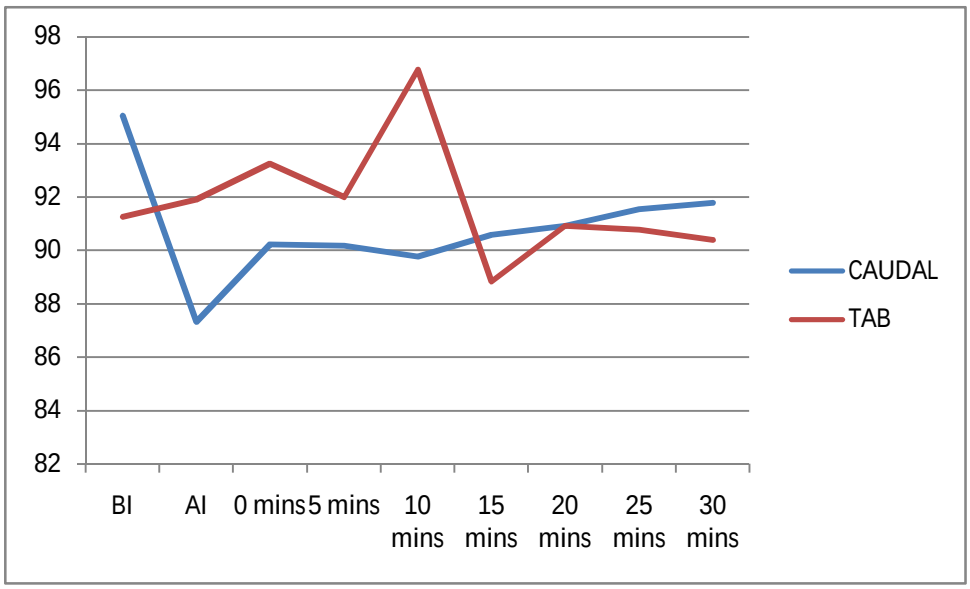
Intra operative Heart Rate		BI	AI	5 mins	10 mins	15 mins
Caudal Group	N	22	22	22	22	22
	Mean	103.55	109.18	105.95	103.05	101.41
	SD	9.95	8.41	8.25	7.57	9.71
TAP Block Group	N	23	23	23	23	23
	Mean	108.35	113.39	106.57	102.61	100.96
	SD	6.87	6.24	6.49	5.11	5.94
P value Unpaired t test		0.0684	0.0649	06	0.8226	0.8523

Intra operative Heart Rate		20 mins	25 mins	30 mins	35 mins	40 mins
Caudal Group	N	22	22	22	17	3
	Mean	99.77	97.05	96.73	95.00	105.00
	SD	7.81	7.98	6.90	6.95	12.53
TAP Block Group	N	23	23	6	1	
	Mean	98.61	98.48	96.83	100.00	
	SD	5.49	4.52	5.23		
P value Unpaired t test		0.5679	0.4665	0.9682		

Most of the caudal group patients had mean intra operative heart rates ranging from 103.55 to 105.00 beats per minute between BI-40 minutes Intra operatively. Similarly the TAP block group patients had mean heart rates ranging from 108.35 to 100.00 beats per minute between BI-35 minutes Intra operatively.

The association between the intervention groups and Intra operative heart rate is considered to be not statistically significant since $p > 0.05$ as per 2 tail unpaired t test.

INTRA OPERATIVE SYSTOLIC BLOOD PRESSURE



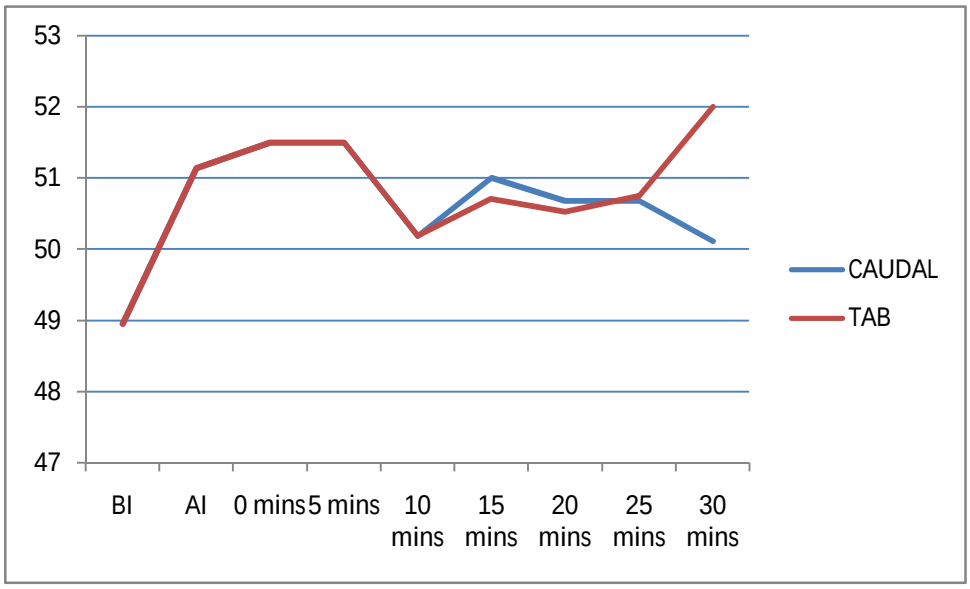
According to my study comparison of Intra operative systolic blood pressure between caudal group and TAP block group was not statistically significant.

Intra operative Systolic Blood Pressure		**BI**	**AI**	**5 mins**	**10 mins**	**15 mins**
Caudal Group	N	22	22	22	22	22
	Mean	95.05	87.32	90.23	90.18	89.77
	SD	2.75	4.00	2.27	2.28	3.24
TAP Block Group	N	23	23	23	23	23
	Mean	96.78	88.83	90.91	90.78	90.39
	SD	3.48	4.04	2.37	2.09	3.20
P value Unpaired t test		0.0696	0.2155	0.3269	0.3626	0.5228

Intra operative Systolic Blood Pressure		20 mins	25 mins	30 mins	35 mins	40 mins
Caudal Group	N	22	22	22	18	3
	Mean	90.59	90.91	91.55	91.78	95.00
	SD	2.95	3.16	3.26	2.90	1.00
TAP Block Group	N	23	23	4	1	
	Mean	91.26	91.91	93.25	92.00	
	SD	2.88	2.07	1.50		
P value Unpaired t test		0.4456	0.2175	0.1286		

Most of the caudal group patients had mean Intra operative systolic blood pressure ranging from 95.05 to 95.00 mm Hg between BI-40 minutes Intra operatively. Similarly the TAP block group patients had mean systolic blood pressure ranging from 96.78 to 92.00 mm Hg between BI-35 minutes Intra operatively. The association between the intervention groups and Intra operative systolic blood pressure is considered to be not statistically significant since $p > 0.05$ as per 2 tail unpaired t test.

INTRA OPERATIVE DIASTOLIC BLOOD PRESSURE



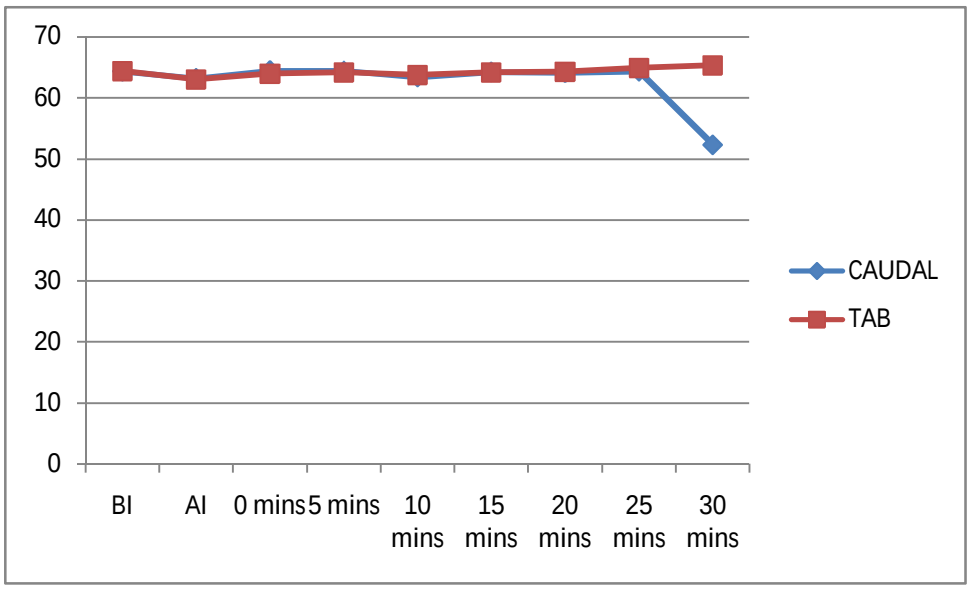
According to my study comparison of Intra operative diastolic blood pressure between caudal group and TAP block group was not statistically significant.

Intra operative Diastolic Blood Pressure		BI	AI	5 mins	10 mins	15 mins
Caudal Group	N	22	22	22	22	22
	Mean	48.95	51.14	51.50	51.50	50.18
	SD	2.03	1.52	1.41	1.47	2.17
TAP Block Group	N	23	23	23	23	23
	Mean	48.17	50.13	50.48	50.83	50.39
	SD	1.61	2.46	1.56	1.56	1.95
P value Unpaired t test		0.1628	0.1054	0.2591	0.1428	0.7356

Intra operative Diastolic Blood Pressure		20 mins	25 mins	30 mins	35 mins	40 mins
Caudal Group	N	22	22	22	18	3
	Mean	51.00	50.68	50.68	50.11	48.00
	SD	1.23	1.17	0.99	1.78	1.00
TAP Block Group	N	23	23	4	1	
	Mean	50.70	50.52	50.75	52.00	
	SD	1.43	1.78	0.96		
P value Unpaired t test		0.4480	0.7224	0.9023		

Most of the caudal group patients had mean Intra operative diastolic blood pressure ranging from 48.95 to 48.00 mm Hg between BI-40 minutes Intra operatively. Similarly the TAP block group patients had mean diastolic blood pressure ranging from 48.17 to 52.00 mm Hg between Induction time to 35 minutes Intra operatively The association between the intervention groups and Intra operative diastolic blood pressure is considered to be not statistically significant since $p > 0.05$ as per 2 tail unpaired t test.

INTRA OPERATIVE MEAN ARTERIAL PRESSURE



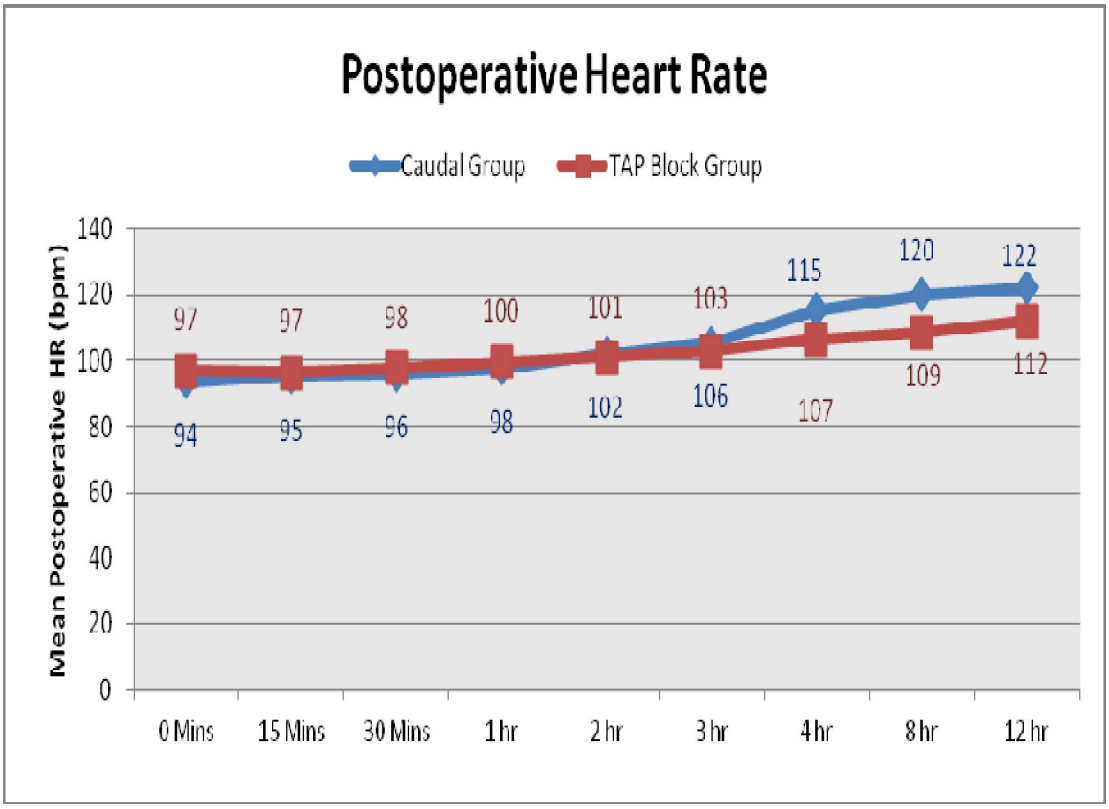
According to my study comparison of Intra operative mean arterial pressure between caudal group and TAP block group was not statistically significant.

Intra operative Mean Arterial Pressure		BI	AI	5 mins	10 mins	15 mins
Caudal Group	N	22	22	22	22	22
	Mean	64.32	63.20	64.41	64.39	63.38
	SD	1.04	1.74	1.05	0.92	1.89
TAP Block Group	N	23	23	23	3	23
	Mean	64.38	63.03	63.96	64.14	63.72
	SD	0.80	2.33	1.28	1.24	1.62
P value Unpaired t test		0.8333	0.7849	0.2016	0.4476	0.5149

Intra operative Mean Arterial Pressure		20 mins	25 mins	30 mins	35 mins	40 mins
Caudal Group	N	22	22	22	22	3
	Mean	64.20	64.09	64.30	52.36	63.67
	SD	1.08	1.20	1.04	25.29	0.58
TAP Block Group	N	23	23	4	1	0
	Mean	64.22	64.32	64.92	65.33	
	SD	0.94	1.51	0.32		
P value Unpaired t test		0.9463	0.5761	0.3872		

Most of the caudal group patients had mean Intra operative mean arterial pressure ranging from 64.32 to 63.67 mm Hg between BI-40 minutes Intra operatively. Similarly the TAP block group patients had mean arterial pressure ranging from 64.38 to 65.33 mm Hg between BI-35 minutes Intra operatively. The association between the intervention groups and Intra operative mean arterial pressure is considered to be not statistically significant since $p > 0.05$ as per 2 tail unpaired t test.

POSTOPERATIVE HEART RATE



Comparison of post operative heart rate between two group is statistically significant.

Postoperative Heart Rate		0 Mins	15 Mins	30 Mins	1 hr	2 hr
Caudal Group	N	22	22	22	22	22
	Mean	93.82	95.45	96.05	97.82	102.27
	SD	6.51	7.58	7.98	7.87	9.50
TAP Block Group	N	23	23	23	23	23
	Mean	97.09	96.61	97.70	99.74	101.09
	SD	4.38	4.00	4.26	5.23	4.94
P value Unpaired t test		0.0567	0.5303	0.3965	0.3433	0.6053

Postoperative Heart Rate		3 hr	4 hr	8 hr	12 hr
Caudal Group	N	22	22	22	22
	Mean	105.68	115.36	120.09	122.09
	SD	11.16	7.66	6.95	5.80
TAP Block Group	N	23	23	23	23
	Mean	103.13	106.52	108.57	112.26
	SD	4.69	5.22	4.77	5.21
P value Unpaired t test		0.3300	**0.0001**	**0.0000**	**0.0000**

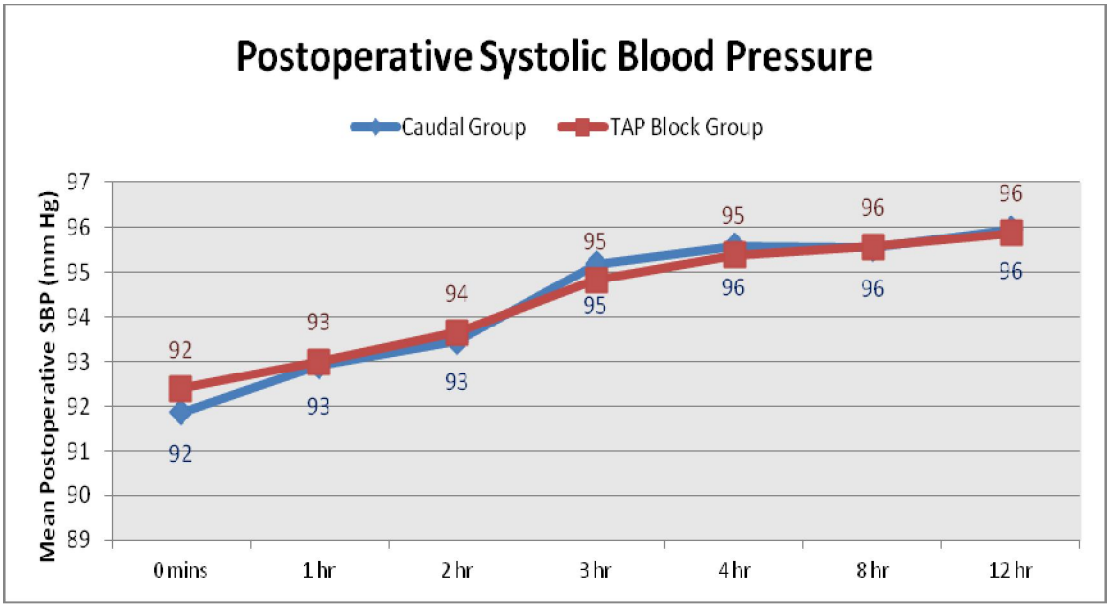
Statistical Significance

In patients belonging to caudal intervention group, the mean post-operative heart rate is 119.18 beats per minute between 4 to 12 hours post-operatively. In the TAP block group the mean post-operative heart rate is 109.12 beats per minute between 4 to 12 hours post-operatively. The increased mean post-operative heart rate in caudal group compared to the TAP block group is STATISTICALLY SIGNIFICANT as the p value is < 0.05 test

indicating a true difference among intervention groups.The mean post-operative heart rate was more in caudal intervention group compared to TAP block intervention group by 10.97 beats per minute with a p value of 0.0001as per 2 tail unpaired t test. This significant difference of 1.09 times increase in mean post-operative heart rate in caudal intervention group compared to TAP block intervention group is true and has not occurred by chance which implies that TAP Block gives better pain relief compared to Caudal block inchildren undergoing Lower abdominal surgeries.

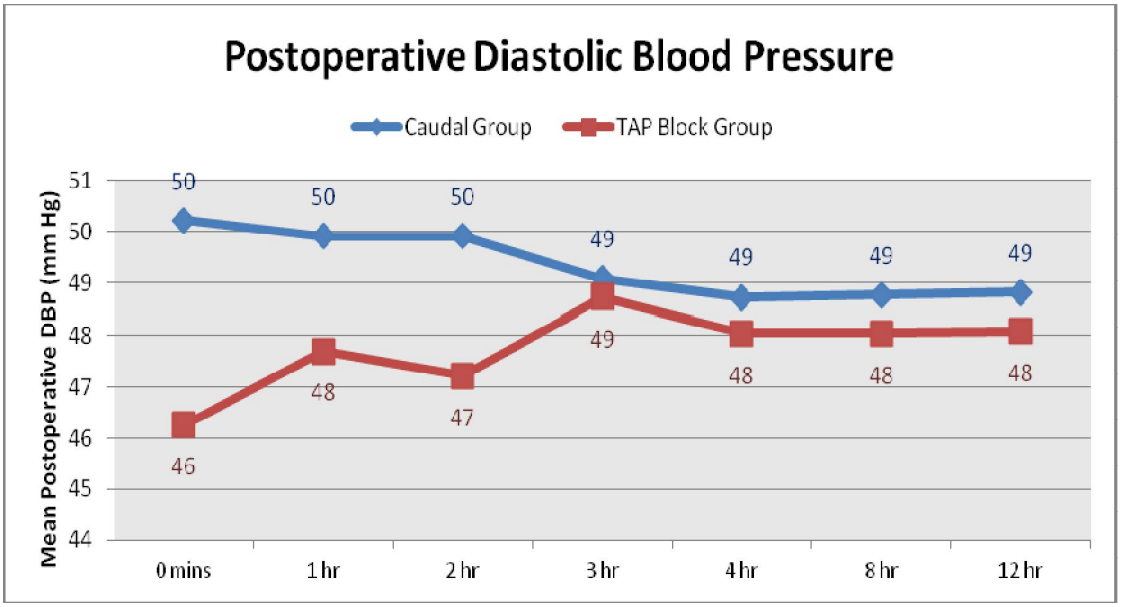
POSTOPERATIVE SYSTOLIC BLOOD PRESSURE

ostoperative Systolic Blood Pressure		**0 mins**	**1 hr**	**2 hr**	**3 hr**	**4 hr**	**8 hr**	**12 hr**
Caudal Group	N	22	22	22	22	22	22	22
	Mean	91.86	92.91	93.45	95.18	95.59	95.55	95.95
	SD	2.62	2.72	1.97	1.84	2.44	1.95	1.86
TAP Block Group	N	23	23	23	23	23	23	23
	Mean	92.39	93.00	93.65	94.83	95.39	95.57	95.87
	SD	2.68	2.58	1.56	2.08	2.68	1.90	1.87
P value Unpaired t test		0.5078	0.9091	0.7115	0.5466	0.7949	0.9727	0.8793



Most of the caudal group patients had mean post-operative systolic blood pressure ranging from 91.86 to 95.95 mm Hg between 0 minutes to 12 hours post-operatively. Similarly the TAP block group patients had mean systolic blood pressure ranging from 92.39 to 95.87 mm Hg between 0 minutes to 12 hours post-operatively The association between the intervention groups and post-operative systolic blood pressure is considered to be not statistically significant since $p > 0.05$ as per 2 tail unpaired t test.

POSTOPERATIVE DIASTOLIC BLOOD PRESSURE

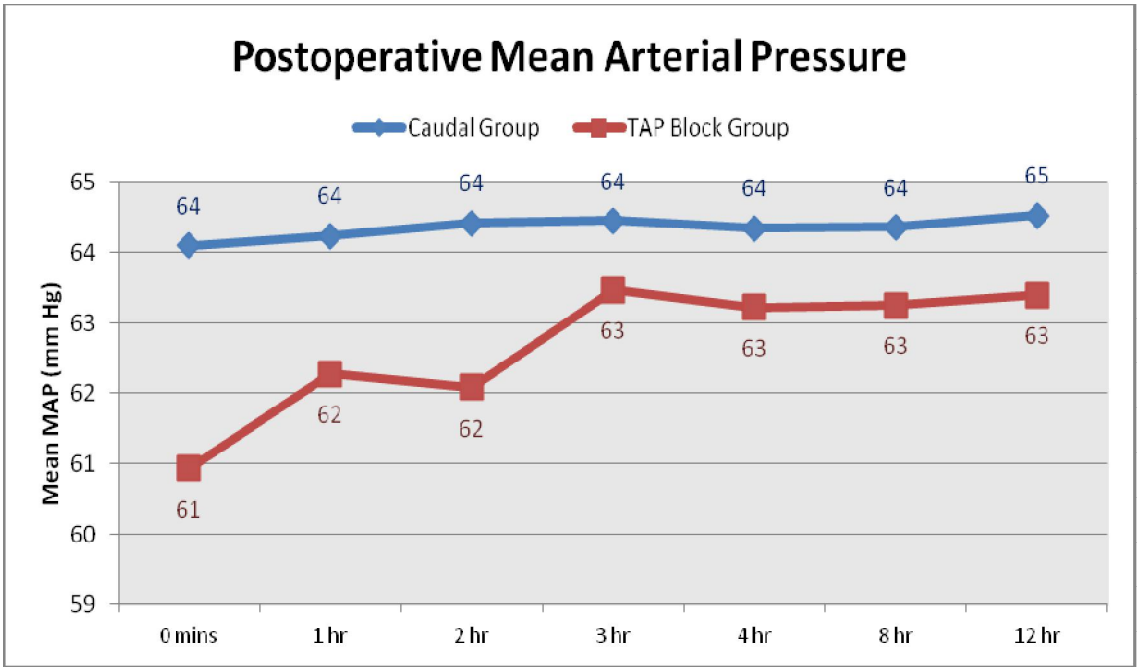


Postoperative Diastolic Blood Pressure		**0 mins**	**1 hr**	**2 hr**	**3 hr**	**4 hr**	**8 hr**	**12 hr**
Caudal Group	N	22	22	22	22	22	22	22
	Mean	50.23	49.91	49.91	49.09	48.73	48.77	48.82
	SD	1.07	1.77	0.87	2.04	1.45	1.51	1.56
TAP Block Group	N	23	23	23	23	23	23	23
	Mean	46.26	47.70	47.22	48.74	48.04	48.04	48.09
	SD	1.66	2.53	1.86	1.60	2.14	2.14	1.35
P value Unpaired t test		0.2160	0.1929	0.1007	0.5255	**0.0000**	**0.0015**	**0.0000**

Statistical Significance

In patients belonging to caudal intervention group, the mean post-operative diastolic blood pressure is 150.05 mm Hg between 0 minutes to 2 hours post-operatively. In the TAP block group the mean post-operative diastolic blood pressure is 141.17 mm Hg between 0 minutes to 2 hours post-operatively. The increased mean post-operative diastolic blood pressure in caudal group compared to the TAP block group is STATISTICALLY SIGNIFICANT as the p value is < 0.05 test indicating a true difference among intervention groups.The mean post-operative diastolic blood pressure was more in caudal intervention group compared to TAP block intervention group by 8.87 mm Hg with a p value of < 0.001as per 2 tail unpaired t test. This significant difference of 1.06 times increase in mean post-operative diastolic blood pressure in caudal intervention group compared to TAP block intervention group is true and has not occurred by chance which implies that TAP Block gives better pain relief compared to Caudal block in children undergoing Lower abdominal surgeries.

Postoperative Mean Arterial Pressure



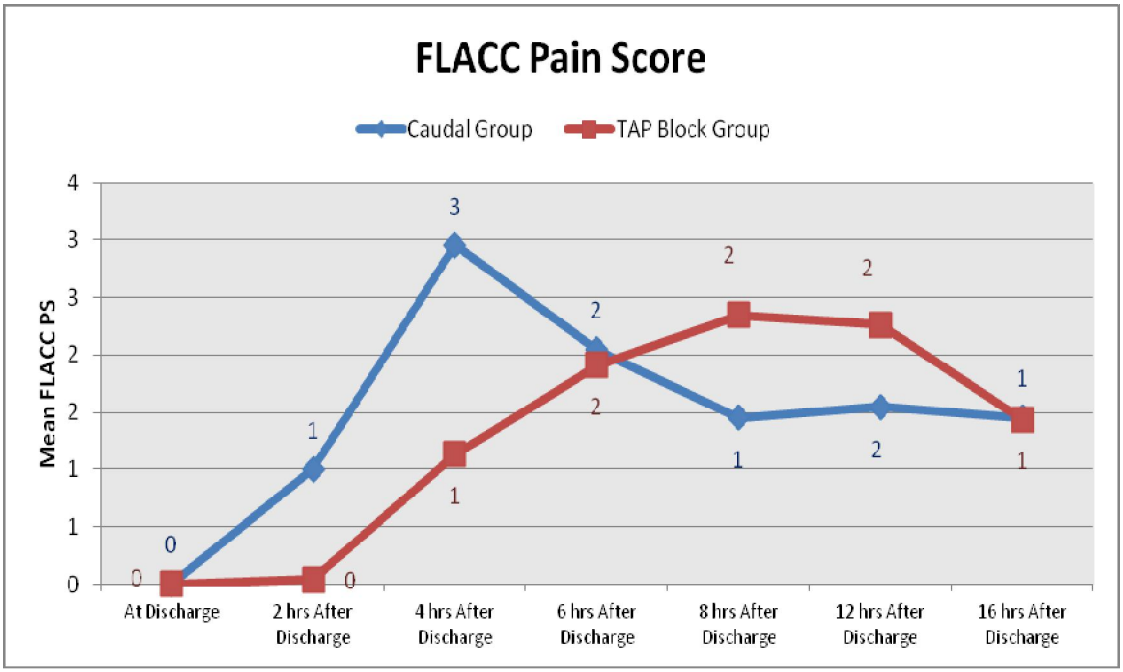
Postoperative Mean Arterial Pressure		0 mins	1 hr	2 hr	3 hr	4 hr	8 hr	12 hr
Caudal Group	N	22	22	22	22	22	22	22
	Mean	64.11	64.24	64.42	64.45	64.35	64.36	64.53
	SD	1.18	1.38	0.80	0.99	1.08	1.27	0.77
TAP Block Group	N	23	23	23	23	23	23	23
	Mean	60.94	62.28	62.09	63.48	63.23	63.26	63.41
	SD	3.39	3.02	2.97	3.63	3.87	3.14	3.04
P value Unpaired t test		0.0002	0.0080	0.0012	0.2251	0.1947	0.1307	0.0979

Statistical Significance

In patients belonging to caudal intervention group, the mean post-operative mean arterial pressure is 64.25 mm Hg between 0 minutes to 2 hours post-operatively. In the TAP block group the mean post-operative mean arterial pressure is 61.76 mm Hg between 0 minutes to 2 hours post-operatively. The increased mean post-operative mean arterial pressure in caudal group compared to the TAP block group is STATISTICALLY SIGNIFICANT as the p value is < 0.05 test indicating a true difference among intervention groups.The mean post-operative mean arterial pressure was more in

caudal intervention group compared to TAP block intervention group by 7.47 mm Hg with a p value of < 0.008as per 2 tail unpaired t test. This significant difference of 1.04 times increase in mean post-operative mean arterial pressure in caudal intervention group compared to TAP block intervention group is true and has not occurred by chance which implies that TAP Block gives better pain relief compared to Caudal block in children undergoing Lower abdominal surgeries

FLACC PAIN SCORE

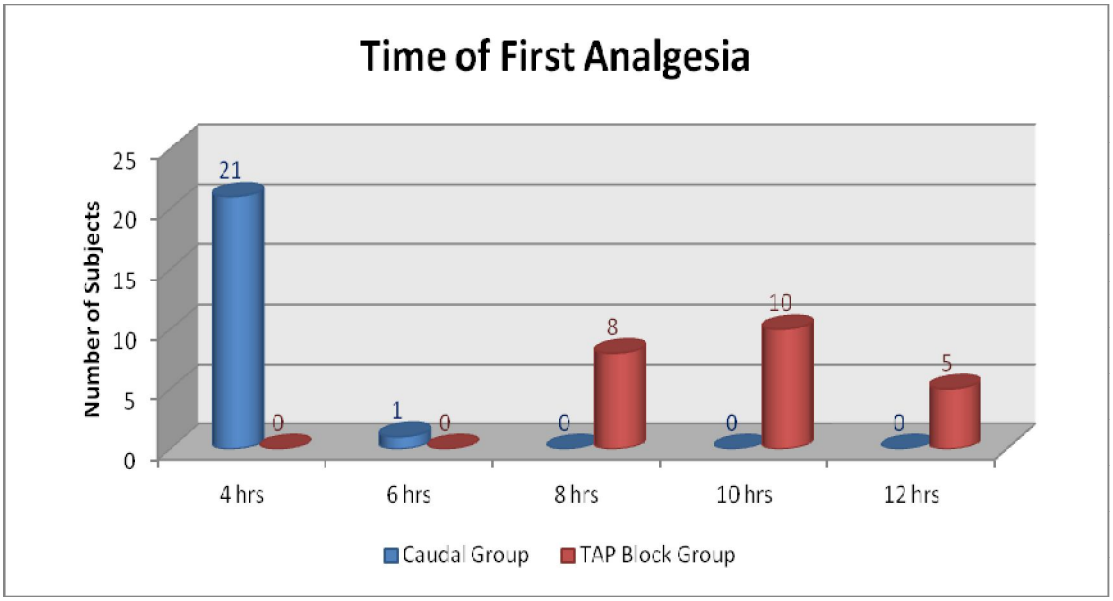


FLACC Pain Score		0 hrs	2 hrs	4 hrs	6 hrs	8 hrs	12 hrs	16 hrs
Caudal Group	N	22	22	22	22	22	22	22
	Mean	0.00	1.00	2.95	2.05	1.45	1.55	1.45
	SD	0.00	0.00	0.21	0.21	0.51	0.51	0.51
TAP Block Group	N	23	23	23	23	23	23	23
	Mean	0.00	0.04	1.13	1.91	2.35	2.26	1.43
	SD	0.00	0.21	0.69	0.85	0.71	0.45	0.51
P value Unpaired t test		>0.9999	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	.8969

Statistical Significance

In patients belonging to caudal intervention group, the mean FLACC pain score is 9.00 mean points between 2-12 hours post-operatively. In the TAP block group the mean FLACC pain score is 7.70 mean points between 2-12 hours post-operatively. The increased mean FLACC pain score in caudal group compared to the TAP block group is STATISTICALLY SIGNIFICANT as the p value is < 0.05 test indicating a true difference among intervention group.The mean FLACC pain score was more in caudal intervention group compared to TAP block intervention group by 1.30 mean points with a p value of < 0.0000as per 2 tail unpaired t test. This significant difference of 1.17times increase in mean FLACC pain score in caudal intervention group compared to TAP block intervention group is true and has not occurred by chance which implies that TAP Block gives better pain relief compared to Caudal block in children undergoing Lower abdominal surgeries

TIME OF FIRST RESCUE ANALGESIA



Time of First Analgesia	Caudal Group		TAP Block Group	
4 hrs	21	5.45	0	.00
6 hrs	1	.55	0	.00
8 hrs	0	.00	8	4.78
10 hrs	0	.00	10	3.48
12 hrs	0	.00	5	1.74
Total	22	00	23	00

Time of First Analgesia	**Caudal Group**	**TAP Block Group**
N	22	23
Mean	245.45	584.35
SD	25.58	90.85
P value Unpaired t test		**0.0000**

Statistical Significance

In patients belonging to caudal intervention group, the mean time for first analgesia is 4 hours 5 minutes. In the TAP block group the mean time for first analgesia is 9hours 44minutes. The increased mean time for first analgesia in TAP group compared to the Caudal block group is statistically significant as the p value is < 0.05 test indicating a true difference among intervention group. The mean time for first analgesia was high in TAP block intervention group compared to caudal block intervention group by 5 hours 39 minutes with a p value of < 0.0000as per 2 tail unpaired t test. This significant difference of 59% decrease in mean time for first analgesia in caudal intervention group compared to TAP block intervention group is true and has not occurred by chance which implies that TAP Block gives better pain relief compared to Caudal block in children undergoing Lower abdominal surgeries

DISCUSSION

TAP block in children is an effective means of providing pain relief in children. Apart from producing adequate Intra operative and postoperative analgesia it has various beneficial effect. It reduces the Intra operative and postoperative analgesics requirements in the form of narcotics and NSAIDS. It provides faster and comfortable wake up times , helps in early ambulation , less hospital stay, thereby alleviating most of the anxiety and burden of the child's parents.

Lower abdominal surgeries like Hernia repair, PV sac ligation, and Appendicectomy are frequently performed surgical procedures in the paediatric population worldwide and is a cause of significant pain during the postoperative period . The optimal analgesic regimen should provide safe, effective analgesia reducing postoperative stress response and accelerating recovery from surgery.

The TAP block provides excellent analgesic blockade to the skin, subcutaneous tissue and muscles supplied by T6–L1, the ilioinguinal and iliohypogastric nerves, and the lateral cutaneous branches of the dorsal rami of L1–3 running in a neurovascular plane between the internal oblique and Transversus abdominis muscles representing the 'target' of local anaesthetic. Therefore, TAP block is used as a part of a multimodal approach after surgery involving the anterior abdominal wall . Moreover,

the use of ultrasound-guided TAP block is an attractive method because of its simplicity and safety.

The current study was aimed to compare the post operative analgesic effect ultrasound guided TAP block and Caudal block in paediatric patients undergoing lower abdominal surgeries.

The two groups which received Ultrasound guided TAP Block and Caudal block were compared with respect age,sex and weight .There was no statistical significant between the two groups.

The two groups which received Ultrasound guided TAP Block and Caudal block were compared with respect Intra operative Hemodynamics. Intra operative hemodynamics like heart rate, systolic blood pressure, diastolic blood pressure and mean arterial pressure were compared between two groups and found to be statistically insignificant as the p value is >0.05. The results obtained from my study is similar to the study done by DALIA M. FAWY et al in which they compared the analgesic efficacy of Transverse Abdominis Plan block vs Caudal block for postoperative pain relief in children undergoing Lower abdominal surgeries.

The two groups which received Ultrasound guided TAP block and Caudal block were compared with respect to POST OPERATIVE HEART RATE at various intervals (0 hr and every 2hrs till 12 th hour. The results obtained were Caudal Epidural

Block for Pain Relief in children undergoing Lower abdominal surgeries significantly increases post-operative heart rate compared to Ultrasound guided Transversus Abdominis Plane Block. This was STATISTICALLY SIGNIFICANT with a p value of < 0.05 (0.0004) and similar to study done by DALIA M.FAWY et al in which they compared the analgesic efficacy of TAP block vs Caudal block for post operative pain relief in children undergoing lower abdominal surgeries which implies that USG GUIDED TAP block provide prolonged postoperative pain relief compared to Caudal block.

The two groups which received Ultrasound guided TAP Block and Caudal block were compared with respect to POST OPERATIVE DIASTOLIC AND MEAN ARTERIAL PRESSURE at various intervals .(0 hr and every 2hrs till 12th hour . The results obtained were Transversus Abdominis Plane block for Pain relief in children undergoing Lower abdominal surgeries significantly decreases the mean post operative diastolic pressure and mean arterial pressure .This was STATISTICALLY SIGNIFICANT with a p value of < 0.05 and similar to study done by DALIA M.FAWY et al in which they compared the analgesic efficacy of TAP block vs Caudal block for post operative pain relief in children undergoing lower abdominal surgeries .Early warring of caudal

block produces increased diastolic blood pressure in comparison to TAP block. This was similar to the study done by PALETI SOPHIA and CO.

The two groups which received Ultrasound guided TAP Block and Caudal block were compared with respect TIME FOR FIRST RESCUE ANALGESIA IN MINUTES. In patients belonging to caudal intervention group, the mean time for first analgesia is 4 hours 5 minutes. In the TAP block group the mean time for first analgesia is 9hours 44minutes. The results obtained were Transversus Abdominis Plane block for Pain relief in children undergoing Lower abdominal surgeries significantly decreases the Time for first rescue analgesia .This was STATISTICALLY SIGNIFICANT with a p value of < 0.05 and similar to study done by DALIA M.FAWY et al in which they compared the analgesic efficacy of TAP block vs Caudal block for post operative pain relief in children undergoing lower abdominal surgeries which implies that TAP block is superior to caudal block in providing prolonged post operative pain relief in children undergoing lower abdominal surgeries.

The two groups which received Ultrasound guided TAP Block and Caudal block were compared with respect to FLACC PAIN SCORES achieved at various intervals .(0 hr and every 2hrs till 16th hour and 20th

and 24th hour. The FLACC score of less than 4 considered as effective analgesia. The effective analgesia was observed up to 8 hours with ultrasound guided TAP block compared to 4 hours with Caudal block. The duration of postoperative analgesia in TAP block group was prolonged. The mean duration of postoperative analgesia in TAP group was 584.35 minutes and that of Caudal group was 245.45 minutes . This was STATISTICALLY SIGNIFICANT with a p value <0.05 and similar to study done by PALETI SOPHIA and CO. al in which they compared the analgesic efficacy of TAP block vs Caudal block for post operative pain relief in children undergoing lower abdominal surgeries which implies that Tap block for lower abdominal surgeries in children provide prolonged pain relief compared to Caudal block.

COMPLICATIONS :

The expected complications were urinary retention ,respiratory depression and vomiting.

There was no complication in both the groups .

SUMMARY

This study was conducted to compare the efficacy of ultrasound guided TAP block vs Caudal block for post operative pain relief in children undergoing lower abdominal surgeries.

The following observations were made :

Duration of analgesia was higher in TAP block group(9hrs 44minutes) compared to Caudal group (4 hours 5 minutes) which was statistically significant.

- FLACC pain score for analgesic assessment were better in the TAP block group compared to Caudal group, which was statistically significant.

-Post operative Heart rate ,Post operative Diastolic and Mean arterial pressure were better in the TAP block group compared to Caudal group, which was statistically significant.

- In both the groups, hemodynamic changes in intra operative Intraod were comparable and insignificant.

- In both the groups , no adverse effects occurred.

CONCLUSION

From my study I conclude that administration of Ultrasound guided TAP BLOCK for children undergoing Lower Abdominal Surgeries increases the duration of post operative analgesia without producing any adverse effects compared to Caudal epidural block. Thus, ultra sound guided TAP block can be used as an alternative technique for safe and prolonged pain relief in children undergoing Lower Abdominal Surgeries.

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24. TOBIAS JD – Weak analgesia and NSAIDS in the management of children with acute pain
25. WAFAA M.AL SADEK et al ANN AND ROBERT et al

They did a study on 108 children 3-7 years who were randomly allocated in two groups .Group A received TAP Block with 0.5 ml / kg of ropivacine 0.375 % bilaterally under ultrasound guidance. Group B received regular analgesics and their analgesic efficacy were compared.

26. WAFER MOHAMED ALSADEK et al

They compared the analgesic efficacy of USG Guided TAP block vs USG guided caudal block for pain relief in children undergoing Lower abdominal surgery.

INFORMATION TO PARTICIPANTS

Investigator: Dr. POOVANNAN.D

Name of the participant:

Title:

A Prospective, randomized control study comparing ultrasound guided Transversus Abdominis Plane Block vs Caudal Epidural Block for postoperative analgesia in children undergoing elective lower abdominal surgeries.

You are invited to take part in this research study. We have got approval from IEC. You are asked to participate because you satisfy the eligibility criteria. We want to compare and study the safety and efficacy of TAP block Vs Caudal block.

Purpose of the research:

For lower abdominal surgeries, patient is anaesthetised, TAP block was given with 0.3ml/Kg of 0.25% Bupivacaine for one group and Caudal block with 1ml/Kg of 0.25% of Bupivacaine is given to another group. This study is done to compare the efficacy of Ultrasound guided TAP block Vs Caudal block for providing postoperative relief in children undergoing lower abdominal surgeries.

The study design:

All the participants in the study will be divided into two groups.

Group 1 – Ultrasound guided TAP block with 0.3ml/Kg of 0.25% Bupivacaine

Group 2 – Caudal block with 1ml/Kg of 0.25% of Bupivacaine

All children will be given anaesthesia by LMA.

Benefits:

Prolonged postoperative relief, thereby reducing postoperative analgesic requirement in 24hr.

Discomforts and risks:

- Hypersensitivity to local anaesthetics
- Respiratory depression – very rare at this dose and if it all occurs it is easily recognisable and treatable
- Hypotension and Bradycardia
- Complications related to caudal block technique

This intervention has been shown to be well tolerated as shown by previous studies. And if you do not want to participate you will have alternative of setting the standard treatment and your safety is our prime concern.

Time:

Date:

Place:

Signature/Thumb impression of Patient

Patient Name:

Signature of the Investigator:

Name of the Investigator:

PATIENT CONSENT FORM

Study Title: “A PROSPECTIVE, RANDOMIZED CONTROL STUDY COMPARING ULTRASOUND GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK VS CAUDAL EPIDURAL BLOCK FOR POSTOPERATIVE ANALGESIA IN CHILDREN UNDERGOING ELECTIVE LOWER ABDOMINAL SURGERIES”.

Study Centre: Institute of Child Health

Egmore

Chennai -8

Participant Name:

I.P.No: Age:

Sex:

I confirm that I have understood the purpose of procedure for the above study. I have the opportunity to ask question and all of my questions and doubts have been answered to my satisfaction.

I have explained about the pitfall in the procedure. I have been explained about the safety, advantage and disadvantage of the technique.

I understand that my participation in the study is voluntary and I am free to withdraw anytime without giving any reason.

I understand that investigator, regulatory authorities and the ethics committee will not need my permission to look at my health records both in respect to current study and any further research that may be conducted in relation to it, even if I withdraw from the study. I understand that my identity will not be revealed in any information released to third parties or published, unless as required under the law. I agree not to restrict the use of any data or results that arise from the study.

Time:

Date:

Place:

Signature/Thumb impression of Patient

Patient Name:

Signature of the Investigator:

Name of the Investigator:

PROFORMA

TITLE:

Comparison of Ultrasound guided Transversus Abdominis Plane Block and Caudal Epidural Block for Pain Relief in children undergoing Lower Abdominal Surgeries.

DATE:
ROLL NO:

NAME: SEX:

AGE: IP NO:

RELIABILITY:

DIAGNOSIS:

SURGICAL PROCEDURE:

PRE OP ASSESSMENT: ASSEMENT NO:

CVS: HT: SPO2:

RS: WT: HR:

HISTORY :

ANY CO-MORBID ILLNESS

H/O PREVIOUS SURGERIES

INFORMED CONSENT IN TAMIL

RANDOMIZATION DONE BY COMPUTER GENERATED NUMBER

IV LINE

PREMEDICATION

MONITORS:

VITALS:

VITALS:

TIME	5 (Min.)	10 (Min.)	15 (Min.)	25 (Min.)	30 (Min.)	40 (Min.)	50 (Min.)	60 (Min.)	1hr. 15min.	1hr. 30 min.	1hr. 45min.	2 hr
HR												
MAP												
SPO2												

DURATION OF SURGERY:

MEASURES OF STUDY OUTCOME:

I. **FLACC PAIN SCORE IN:**

TIME (Hr.)	**2**	**4**	**6**	**8**	**10**	**12**
FLACC PAIN SCORE						

II. **ANALGESIC REQUIRMENT:**

- TIME TO FIRST ANALGESIC REQUIRMENT IN MIN:
- TOTAL DOSE OF IV FENTANYL NEEDED:

III. **POST OF HAEMODYNAMICS:**

TIME	**30 min.**	**1hr.**	**1hr 30 min**	**2hr**	**2hr 30 mins**	**3hr**	**4hr**	**5hr**	**6hr**	**7hr**	**8hr**	**10hr**	**12hr**
HR													
MAP													
SPO2													

ஆராய்ச்சி தகவல் தாள்

ஆராய்ச்சி தலைப்பு

குழந்தைகளுக்கு கீழ் வயிற்று பகுதியில் அறுவை சிகிச்சைக்குப் பின் வலி நிவாரணத்திற்கு நுண்ணொளி மூலமாக டேப் மற்றும் காடல் பிளாக் தந்து இரட்டை மறைவு ஒப்பீடு செய்தல்.

ஆராய்ச்சியாளர் பெயர் : மருத்துவர்.த.பூவண்ணன்

பங்கேற்பாளர் பெயர் :

ஆராய்ச்சியின் நோக்கம்

குழந்தைகளுக்கு கீழ் வயிற்று பகுதியில் அறுவை சிகிச்சைக்குப் பின் வலி நிவாரணத்திற்கு நுண்ணொளி மூலமாக டேப் மற்றும் காடல் பிளாக் தந்து இரட்டை மறைவு ஒப்பீடு செய்தல்.

1) வெற்றி விகிதம் மற்றும் உணர்ச்சியற்றல் ஆரம்பித்தல் நேரம்

2) செயல்திறன் நேரம் மற்றும் ஊசி செலுத்துவதன் எண்ணிக்கை

3) அறுவை சிகிச்சையின்போது இதர வலி நிவாரணிகளின் தேவை

4) பக்க விளைவுகள்

ஆய்வு முறை

ஆய்வில் பங்குபெறும் நோயாளிகள் இரண்டு குழுக்களாகப் பிரிக்கப்படுவர்.

குழு-1 டேப் பிளாக் தருவது

குழு-2 காடல் பிளாக் தருவது

நன்மைகள்

1) அறுவை சிகிச்சையின்போது நாடித்துடிப்பு மற்றும் இரத்த அழுத்தம் சீராக செயல்பட உதவுகின்றன.

2) இதர வலி நிவாரணிகளின் தேவை வெகுவாக குறைக்கப்படுகின்றன.

3) அறுவை சிகிச்சைக்குப் பின்னர் வலி நிவாரணத்தின் தன்மை நீட்டிக்கப்படுகின்றது.

பக்கவிளைவுகள்

ஊசி போடும்போது அசௌகரியம் ஏற்படலாம். மரத்துப்போகும் ஊசியின் மூலம் இது தவிர்க்கப்படும். குறைந்த இரத்த அழுத்தம், குறைந்த நாடித்துடிப்பு ஏற்படலாம். அதற்கு மாற்று மருந்துகள் உடனடியாக கொடுக்கப்படும்.

இந்த முறையான ஆய்வு ஏற்கனவே பல இடங்களில் நடத்தப்பட்டுள்ளது. மேலும் இதன் பாதுகாப்பு உறுதிசெய்யப்பட்டுள்ளது. நீங்கள் இந்த ஆய்வில் பங்குகொள்ள விரும்பவில்லை என்றால் எப்போதும் உபயோகிக்கப்படும் மருந்தே கொடுக்கப்படும். உங்கள் பாதுகாப்பே எங்களின் முக்கிய நோக்கம்.

இந்த ஆய்வு சம்பந்தமான எல்லா புள்ளி விவரங்கள் மற்றும் நோயாளிகளின் விவரங்கள் ரகசியமாக வைக்கப்படும். இந்த ஆய்வு சம்பந்தப்பட்ட எல்லா பரிசோதனைகள், மருந்துகள் மற்றும் மருத்துவ சேவைகள் அனைத்தும் நோயாளிகளுக்கு இலவசமாக வழங்கப்படும்.

ஆய்வாளரின் பெயர் **பங்குபெறுபவரின் பெற்றோர் பெயர்**

ஆய்வாளரின் கையொப்பம் **பங்குபெறுபவரின் பெற்றோர் கையொப்பம்**

ஆராய்ச்சி ஒப்புதல் படிவம்

ஆராயச்சியின் தலைப்பு

குழந்தைகளுக்கு கீழ் வயிற்று பகுதியில் அறுவை சிகிச்சைக்குப் பின் வலி நிவாரணத்திற்கு நுண்ணொளி மூலமாக டேப் மற்றும் காடல் பிளாக் தந்து இரட்டை மறைவு ஒப்பீடு செய்தல்.

ஆய்வு நிலையம் : மயக்கவியல் துறை, சென்னை மருத்துவக் கல்லூரி சென்னை – 3.

பங்கு பெறுவரின் பெயர் :

பங்குபெறுபவரின் எண் :

பங்குபெறுபவர் இதனை (✓) குறிக்கவும்

மேலே குறிப்பிட்டுள்ள மருத்துவ ஆய்வின் விவரங்கள் எனக்கு விளக்கப்பட்டது. என்னுடைய சந்தேகங்களை கேட்கவும், அதற்கான தகுந்த விளக்கங்களை பெறவும் வாய்ப்பளிக்கப்பட்டது. ☐

நான் இவ்வாய்வில் தன்னிச்சையாகதான் பங்கேற்கிறேன். எந்த காரணத்தினாலோ எந்த கட்டத்திலும் எந்த சட்ட சிக்கலுக்கும் உட்படாமல் நான் இவ்வாய்வில் இருந்து விலகி கொள்ளலாம் என்றும் அறிந்து கொண்டேன். ☐

இந்த ஆய்வு சம்பந்தமாகவோ, இதை சார்ந்த மேலும் ஆய்வு மேற்கொள்ளும் போதும் இந்த ஆய்வில் பங்குபெறும் மருத்துவர் என்னுடைய மருத்துவ அறிக்கைகளை பார்ப்பதற்கு என் அனுமதி தேவையில்லை என அறிந்து கொள்கிறேன். நான் ஆய்வில் இருந்து விலகிக் கொண்டாலும் இது பொருந்தும் என அறிகிறேன். ☐

இந்த ஆய்வின் மூலம் கிடைக்கும் தகவல்களையும், பரிசோதனை முடிவுகளையும் மற்றும் சிகிச்சை தொடர்பான தகவல்களையும் மருத்துவர் மேற்கொள்ளும் ஆய்வில் பயன்படுத்திக்கொள்ளவும் அதை பிரசுரிக்கவும் என் முழு மனதுடன் சம்மதிக்கின்றேன். ☐

இந்த ஆய்வில் பங்கு கொள்ள ஒப்புக்கொள்கிறேன். எனக்கு கொடுக்கப்பட்ட அறிவுரைகளின்படி நடந்து கொள்வதுடன் 'இந்த ஆய்வை மேற்கொள்ளும் மருத்துவ அணிக்கு உண்மையுடன் இருப்பேன் என்று உறுதியளிகிறேன். ☐

பங்கேற்பவரின் பெற்றோர் கையொப்பம் ..... இடம்..... தேதி.....

கட்டைவிரல் ரேகை

பங்கேற்பவரின் பெயர் மற்றும் விலாசம் .....

ஆய்வாளரின் கையொப்பம் ..... இடம்..... தேதி.....

ஆய்வாளரின் பெயர் .....

INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI-3

EC Reg No.ECR/270/Inst./TN/2013
Telephone No. 044 25305301
Fax : 044 25363970

CERTIFICATE OF APPROVAL

To
Dr.D.Poovannan
Postgraduate M.D.(Anaesthesiology)
Madras Medical College
Chennai 600 003

Dear Dr.D.Poovannan,

The Institutional Ethics Committee has considered your request and approved your study titled **"Comparison of Ultrasound guided Transversus Abdominis Plane Block and Caudal Epidural Block for Pain relief in children undergoing Lower Abdominal Surgeries" No.20042015.**

The following members of Ethics Committee were present in the meeting held on 07.04.2015 conducted at Madras Medical College, Chennai-3.

1. Prof.C.Rajendran, M.D.,	: Chairperson
2. Prof.R.Vimala, M.D., Dean, MMC, Ch-3	: Deputy Chairperson
3. Prof.B.Kalaiselvi, M.D., Vice-Principal, MMC, Ch-3	: Member Secretary
4. Prof.B.Vasanthi, M.D., Prof. of Pharmacology, MMC	: Member
5. Prof.P.Ragumani, M.S., Professor of Surgery, MMC	: Member
6. Prof.S.Baby Vasumathi, Director, Inst. Of O&G, MMC	: Member
7. Prof.K.Ramadevi, Director, Inst.of Biochemistry, MMC	: Member
8. Prof.Saraswathy, M.D., Director, Pathology, MMC, Ch-3	: Member
9. Prof.K.Srinivasagalu, M.D.,Director, I.I.M. MMC, Ch-3	: Member
10.Thiru S.Rameshkumar, B.Com., MBA	: Lay Person
11.Thiru S.Govindasamy, B.A., B.L.,	: Lawyer
12.Tmt.Arnold Saulina, M.A., MSW.,	: Social Scientist

We approve the proposal to be conducted in its presented form.

The Institutional Ethics Committee expects to be informed about the progress of the study and SAE occurring in the course of the study, any changes in the protocol and patients information/informed consent and asks to be provided a copy of the final report.

8/4/15

Member Secretary, Ethics Committee

								PERIOP HEART RATE															
S.NO	NAME	AGE	SEX	WEIGHT	PROCEDURE	IP NO	DOS	BI	AI	5	10	15	20	25	30	35	40	45	50	IHR	0	15	30
1	THIRUMAI	5	M	16	Herniotomy	1231	30	108	118	104	102	100	98	100	101						95	94	90
2	JAGADESH	3	M	10	Pv sac ligation	1321	30	98	108	102	104	102	100	99	91						94	94	98
3	ROSHAN	8	M	16	Herniotomy	789	30	86	99	104	100	96	98	92	94						86	88	90
4	LOKESH	4	M	13	Herniotomy	765	35	100	104	102	98	94	97	90	92	92					88	86	89
5	SULAIMAN	5	M	15	Herniotomy	897	30	98	110	112	106	109	103	104	108						100	104	102
6	LOKESH	5	M	13	Pv sac ligation	864	30	81	93	90	91	90	84	80	87						80	86	82
7	STAELIN	6	M	15	orchidopexy	964	28	94	100	102	101	96	98	92	94						92	94	90
8	SARATHY	6	M	16	Pv sac ligation	923	28	102	108	104	100	98	94	92	93						90	91	94
9	KISHORE	8	M	18	Pv sac ligation	932	28	106	110	104	106	100	101	96	95						92	90	91
10	AKASH	5	M	16	Pv sac ligation	1029	32	100	104	100	98	94	97	92	93						91	90	94
11	DINESH	9	M	15	Pv sac ligation	1094	28	101	106	101	102	99	96	92	93						92	96	94
12	SIVAKUMA	5	M	16	Herniotomy	1098	30	98	94	99	96	94	90	92	93						90	91	92
13	LAKSHMA	6	M	18	Herniotomy	880	35	114	118	121	124	136	124	121	118	117					113	120	124
14	SANTHOSH	7	M	17	Herniotomy	969	30	116	120	114	110	104	108	96	94						98	96	100
15	SIDDARTH	4	M	13	Herniotomy	901	30	108	114	109	101	100	96	98	94						91	96	94
16	KAVIYA	5	F	15	Pv sac ligation	2003	29	116	117	120	114	108	104	107	106						100	104	102
17	DILIP	6	M	16	Pv sac ligation	1098	28	104	114	103	104	108	110	101	100						94	98	96
18	THILAGAN	4	M	14	Herniotomy	1875	29	120	121	116	108	110	104	100	100						91	94	98
19	YUVARAJ	5	M	13	Herniotomy	1786	29	116	120	118	110	106	102	104	100						101	104	101
20	RAHUL	6	M	17	Herniotomy	1254	30	114	116	112	106	101	100	100	98						96	98	100
21	PARVEEN	7	M	16	Herniotomy	1263	25	100	104	94	90	90	96	93	92						98	96	98
22	AKASH	5	M	15	Pv sac ligation	931	30	98	104	100	96	96	95	94	92						92	90	94

						GROUP A(CAUDAL)									
POST OP HEARTRATE						PERIOP SYSTOLIC BP									
1HR	2HR	3HR	4HR	8HR	12 HR	BI	AI	5	10	15	20	25	30	35	40
96	98	118	120	116	118	96	88	92	91	89	94	92	92		
94	96	98	126	120	124	87	83	88	90	91	92	84	84		
94	90	92	104	112	118	96	92	90	89	87	86	90	92		
87	90	91	110	118	120	96	88	90	87	86	88	84	82	84	
106	110	108	120	126	120	96	88	92	91	89	94	92	92		
86	87	94	106	104	118	96	80	94	92	83	86	91	94		
96	92	90	110	118	116	94	88	90	89	88	92	90	94		
92	96	94	104	107	118	96	90	92	89	89	86	90	92		
94	99	96	110	121	130	96	92	90	89	86	87	89	90		
90	98	104	121	124	126	98	91	89	88	92	90	92	94		
91	100	106	118	126	114	101	96	90	94	94	96	94	92		
94	106	100	121	124	126	94	88	91	92	94	92	91	94		
121	128	136	134	131	128	94	86	92	90	89	90	92	94	92	
98	102	110	116	121	131	96	90	94	91	89	94	92	90		
99	114	119	121	126	124	98	88	89	91	92	92	96	94		
101	104	110	118	121	130	91	80	86	88	92	90	94	92		
99	101	104	118	124	122	94	84	89	90	92	91	89	94		
108	114	112	114	128	131	96	90	94	96	92	92	94	94		
102	110	118	121	129	124	94	83	88	86	89	91	94	92		
107	106	108	110	118	120	92	84	86	88	84	86	86	88		
101	108	109	106	114	110	96	84	90	91	94	92	90	94		
96	101	108	110	114	118	94	88	89	92	94	92	94	90		

GROUP C (CAUDAL)

PERI OP DIASTOLIC BP															PERIOP MAP									
45	50	1HR	BI	AI	5	10	15	20	25	30	35	40	45	50	1HR	BI	AI	5	10	15	20	25	30	35	40
			49	54	52	53	54	52	50	52						64.6667	65.3333	65.3333	65.6667	65.6667	66	64	65.3333		
			54	54	52	49	46	48	50	51						65	63.6667	64	62.6667	61	62.6667	61.3333	62		
			48	52	50	52	55	54	51	50						64	65.3333	63.3333	64.3333	65.6667	64.6667	64	64		
			47	50	52	51	50	52	50	51	52					63.3333	62.6667	64.6667	63	62	64	61.3333	61.3333	62.6667	
			50	50	51	48	48	51	52	50						65.3333	62.6667	64.6667	62.3333	61.6667	65.3333	65.3333	64		
			50	50	50	51	48	50	51	51						65.3333	60	64.6667	64.6667	59.6667	62	64.3333	65.3333		
			50	52	51	53	53	51	52	50						64.6667	64	64	65	64.6667	64.6667	64.6667	64.6667		
			52	51	52	51	48	50	50	51						66.6667	64	65.3333	63.6667	61.6667	62	63.3333	64.6667		
			50	51	50	51	48	51	51	52						65.3333	64.6667	63.3333	63.6667	60.6667	63	63.6667	64.6667		
			46	52	52	54	51	52	51	50						63.3333	65	64.3333	65.3333	64.6667	64.6667	64.6667	64.6667		
			45	50	51	50	49	50	50	52						63.6667	65.3333	64	64.6667	64	65.3333	64.6667	65.3333		
			50	50	53	51	50	50	50	51						64.6667	62.6667	65.6667	64.6667	64.6667	64	63.6667	65.3333		
			51	48	51	51	50	53	52	50	52					65.3333	60.6667	64.6667	64	63	65.3333	65.3333	64.6667	65.3333	
			48	50	50	52	48	51	50	52						64	63.3333	64.6667	65	61.6667	65.3333	64	64.6667		
			48	52	54	52	51	50	49	49						64.6667	64	65.6667	65	64.6667	64	64.6667	64		
			49	50	52	54	52	51	50	51						63	60	63.3333	65.3333	65.3333	64	64.6667	64.6667		
			46	53	54	52	52	51	54	49						62	63.3333	65.6667	64.6667	65.3333	64.3333	65.6667	64		
			48	53	51	50	51	51	51	50						64	65.3333	65.3333	65.3333	64.6667	64.6667	65.3333	64.6667		
			48	50	48	52	49	50	49	49						63.3333	61	61.3333	63.3333	62.3333	63.6667	64	63.3333		
			49	51	52	53	50	52	50	51						63.3333	62	63.3333	64.6667	61.3333	63.3333	62	63.3333		
			49	50	53	52	51	51	52	51						64.6667	61.3333	65.3333	65	65.3333	64.6667	64.6667	65.3333		
			50	52	52	51	50	51	50	52						64.6667	64	64.3333	64.6667	64.6667	64.6667	64.6667	64.6667		

			POST OP SYSTOLIC BP							POST OP DIASTOLIC BP							POST OP MAP						
45	50	1HR	0	1	2	3	4	8	12	0	1	2	3	4	8	12	0	1	2	3	4	8	12
			94	96	95	94	96	94	93	49	49	50	51	49	49	50	64	64.6667	65	65.3333	64.6667	64	64.3333
			88	87	88	96	92	94	92	49	50	50	49	50	46	51	62	62.3333	62.6667	64.6667	64	62	64.6667
			94	92	96	94	98	96	94	51	51	50	50	46	49	49	65.3333	64.6667	65.3333	64.6667	63.3333	64.6667	64
			84	86	90	91	88	90	92	48	46	51	53	49	46	52	60	59.3333	64	65.6667	62	60.6667	65.3333
			94	92	94	96	97	95	96	50	51	51	49	46	50	49	64.6667	64.6667	65.3333	64.6667	63	65	64.6667
			94	96	96	98	96	95	97	49	50	49	46	50	49	50	64	65.3333	64.6667	63.3333	65.3333	64.3333	65.6667
			93	91	96	94	96	98	96	51	50	50	49	48	48	49	65	63.6667	65.3333	64	64	64.6667	64.6667
			94	96	94	97	95	94	97	50	46	49	47	49	47	50	64.6667	62.6667	64	63.6667	64.3333	62.6667	65.6667
			89	91	92	90	93	94	95	51	52	50	53	50	50	50	63.6667	65	64	65.3333	64.3333	64.6667	65
			90	91	95	96	96	98	96	51	53	50	49	51	49	48	64	65.6667	65	64.6667	66	65.3333	64
			94	94	92	96	98	97	99	51	50	51	47	49	50	47	65.3333	64.6667	64.6667	63.3333	65.3333	65.6667	64.3333
			92	94	93	96	98	95	96	50	49	50	50	46	50	50	64	64	64.3333	65.3333	63.3333	65	65.3333
			92	95	93	95	94	96	98	49	49	50	49	47	48	48	63.3333	64.3333	64.3333	64.3333	62.6667	64	64.6667
			91	94	93	96	95	97	98	51	50	49	45	49	49	47	64.3333	64.6667	63.6667	62	64.3333	65	64
			93	96	94	95	97	94	95	50	49	50	49	50	51	50	64.3333	64.6667	64.6667	64.3333	65.6667	65.3333	65
			92	95	94	96	97	98	96	50	48	52	49	49	48	49	64	63.6667	66	64.6667	65	64.6667	64.6667
			93	94	94	96	97	98	96	50	49	50	48	47	48	46	64.3333	64	64.6667	64	63.6667	64.6667	62.6667
			96	95	95	97	99	98	97	49	51	49	50	49	49	47	64.6667	65.6667	64.3333	65.6667	65.6667	65.3333	63.6667
			90	93	94	96	94	95	97	51	50	48	50	49	50	46	64	64.3333	63.3333	65.3333	64	65	63
			90	92	94	96	97	95	98	52	52	50	46	50	51	49	64.6667	65.3333	64.6667	62.6667	65.6667	65.6667	65.3333
			92	91	93	95	94	96	97	51	52	50	51	49	46	48	64.6667	65	64.3333	65.6667	64	62.6667	64.3333
			92	93	91	94	96	95	96	52	51	49	50	50	50	49	65.3333	65	63	64.6667	65.3333	65	64.6667

GROUP A(CAUDAL)

S.NO	FLACC PAIN SCORE									TIME OF 1ST ANALGESIA IN MIN	POST OP COMPLICATIONS								
	0HR	2HR	4HR	6HR	8HR	12HR	16HR	20HR	24HR		ESPIRATORY DEPRESSIO			URINARY RETENTION			APNOEA		PONV
1	0	1	3	2	2	2	1	2	2	240	0	0	0	0	0	0	0	0	0
2	0	1	3	2	2	1	2	2	2	240	0	0	0	0	0	0	0	0	0
3	0	1	3	2	2	2	1	2	2	240	0	0	0	0	0	0	0	0	0
4	0	1	3	2	2	2	1	2	2	240	0	0	0	0	0	0	0	0	0
5	0	1	3	2	2	2	1	2	2	240	0	0	0	0	0	0	0	0	0
6	0	1	3	2	2	1	2	2	2	240	0	0	0	0	0	0	0	0	0
7	0	1	2	3	1	1	2	2	2	360	0	0	0	0	0	0	0	0	0
8	0	1	3	2	2	1	2	2	2	240	0	0	0	0	0	0	0	0	0
9	0	1	3	2	2	1	2	2	2	240	0	0	0	0	0	0	0	0	0
10	0	1	3	2	2	1	2	2	2	240	0	0	0	0	0	0	0	0	0
11	0	1	3	2	1	1	2	2	2	240	0	0	0	0	0	0	0	0	0
12	0	1	3	2	1	1	2	2	2	240	0	0	0	0	0	0	0	0	0
13	0	1	3	2	1	1	2	2	2	240	0	0	0	0	0	0	0	0	0
14	0	1	3	2	2	1	2	2	2	240	0	0	0	0	0	0	0	0	0
15	0	1	3	2	1	2	1	2	2	240	0	0	0	0	0	0	0	0	0
16	0	1	3	2	1	2	1	2	2	240	0	0	0	0	0	0	0	0	0
17	0	1	3	2	1	2	1	2	2	240	0	0	0	0	0	0	0	0	0
18	0	1	3	2	1	2	1	2	2	240	0	0	0	0	0	0	0	0	0
19	0	1	3	2	1	2	1	2	2	240	0	0	0	0	0	0	0	0	0
20	0	1	3	2	1	2	1	2	2	240	0	0	0	0	0	0	0	0	0
21	0	1	3	2	1	2	1	2	2	240	0	0	0	0	0	0	0	0	0
22	0	1	3	2	1	2	1	2	2	240	0	0	0	0	0	0	0	0	0
23	0	1	3	2	1	2	1	2	2	240	0	0	0	0	0	0	0	0	0

								GROUP T (TAP BLOCK)																		
								PERIOP HEART RATE													POST OP HEARTRATE						
S.NO	NAME	AGE	PROCED	SEX	WEIGHT	IP NO		BI	AI	5	10	15	20	25	30	35	40	45	50	1HR	0	15	30	1HR	2HR	3HR	4HR
1	YOGESH	6	Hernioton	M	16	967	30	100	106	100	98	96	90	94	91						92	96	98	100	104	100	110
2	NAVEEN	8	Pv sac liga	M	17	932	25	104	110	104	106	100	96	98							94	98	100	104	100	104	105
3	KISHORE	6	Hernioton	M	16	824	30	98	106	100	101	99	96	94	92						92	91	96	98	100	107	106
4	SAIGANI	5	Hernioton	M	16	1012	30	108	114	104	106	104	100	104	102						101	100	101	104	105	106	109
5	JANIFEN	3.5	Hernioton	M	14	854	30	116	120	104	104	100	101	97	96						96	97	94	98	99	101	104
6	ANUPRIY	4	Pv sac liga	F	16	912	30	110	114	116	104	106	100	100	102						98	94	98	96	99	99	107
7	SHAJMIT	5	orchidope	M	15	1213	30	114	116	106	100	96	94	96	97						96	94	96	96	99	101	104
8	ALAN	3	Pv sac liga	M	12	875	30	118	120	114	100	106	102	104	100						103	101	103	104	107	108	106
9	HEMAPR	3	Pv sac liga	M	13	990	30	106	110	104	99	98	96	97	96						98	96	96	98	100	101	104
10	VIGNESI	4	Pv sac liga	M	13	1065	30	114	116	111	107	106	104	101	97						102	102	104	108	106	112	116
11	ABIRAM	8	Pv sac liga	F	17	984	30	107	110	106	100	98	97	94	97						96	96	94	98	99	104	108
12	SANTHO	3	Hernioton	M	11	962	30	118	120	116	110	108	107	104	100						100	102	102	108	106	110	114
13	MANIKA	7	Hernioton	M	16	1321	35	120	126	118	112	110	112	106	98	97					108	108	110	114	116	112	118
14	SUSEND	6	Hernioton	M	15	980	26	106	110	108	102	100	94	94							96	96	94	96	98	99	103
15	RAMKUN	4	Hernioton	M	13	1009	29	103	106	100	98	97	94	96	98						92	94	93	94	96	99	106
16	VICKY	4	Pv sac liga	M	12	648	30	106	110	106	100	98	96	97	97						93	92	96	94	96	99	107
17	SRIKANT	5	Pv sac liga	M	15	789	30	107	110	104	101	96	98	93	97						94	96	96	98	100	104	101
18	HARIHAI	7	Hernioton	M	16	889	30	104	109	101	102	98	94	96	98						94	94	96	94	95	96	96
19	JOTHI	5	Hernioton	M	13	973	29	101	108	96	94	92	94	96	97						93	92	91	96	98	99	100
20	MONISH	6	Hernioton	F	17	1087	29	98	106	97	94	96	94	97	97						94	94	96	96	98	100	104
21	ABISHEK	5	Hernioton	M	14	965	29	114	121	114	110	116	107	106	104						104	94	96	98	98	101	106
22	KARTHIK	3	Pv sac liga	M	10	890	29	118	126	116	112	108	106	107	108						101	100	101	104	108	110	114
23	DHANUS	5	Pv sac liga	M	15	906	35	102	114	106	100	94	96	94	96	98					96	95	96	98	98	100	102

		PERIOP SYSTOLIC BP													PERIOP DIASTOLIC BP											
8HR	12 HR	BI	A1	5	10	15	20	25	30	35	40	45	50	1HR	BI	A1	5	10	15	20	25	30	35	40	45	50	1HR
104	110	94	98	90	80	88	92	90	94						49	49	49	53	52	51	51	50					
109	110	96	90	94	91	89	94	92							46	52	49	52	48	50	52						
108	110	96	92	90	89	87	86	90	92						49	52	48	52	55	54	50	52					
108	110	103	88	92	91	89	94	94	92	92					46	51	52	52	54	49	50	51	52				
110	111	94	88	89	92	94	90	92	96						49	48	51	51	50	48	52	52					
104	114	96	84	90	91	94	92	90	90						47	48	53	52	49	50	51	52					
109	118	92	84	86	88	84	86	89	90						51	46	48	50	49	51	48	50					
109	118	94	83	88	86	86	89	91	96						49	43	48	47	49	53	49	50					
108	110	100	90	94	96	92	92	94	90						48	52	51	49	51	51	50	52					
113	114	94	84	89	90	92	91	89	92						50	53	51	52	52	51	53	52					
106	110	91	82	88	92	90	94	92	94						51	52	51	52	52	50	50	50					
116	118	98	88	89	91	92	92	96	96						49	52	54	51	51	50	55	53					
120	128	94	86	92	90	89	90	92	92	94					49	48	51	52	50	54	51	52	53				
106	110	94	88	91	92	94	92	91							49	50	51	50	51	50	46						
108	110	100	96	91	94	95	96	94	94						46	49	51	50	49	49	49	48					
109	114	98	91	89	88	92	90	92	92						49	49	52	52	50	51	51	50					
111	110	96	90	92	89	86	87	89	90						49	53	51	51	48	51	49	48					
99	101	98	94	96	92	89	86	90	92						49	51	49	51	53	51	52	51					
104	110	105	92	94	92	89	92	94	94						46	49	49	52	51	50	51	52					
108	110	96	88	92	91	89	94	92	92						46	50	51	48	48	51	51	50					
104	110	101	88	90	91	94	92	93	95						46	52	50	51	50	50	51	50					
118	118	100	91	93	92	96	94	96	96						47	52	51	51	49	50	50	50					
106	108	96	88	92	91	89	94	92	92	94					48	52	50	48	48	51	50	52	53				

PERIOP MAP													POST OP SYSTOLIC BP							POSTOP DIASTOLIC BP							
BI	AI	5	10	15	20	25	30	35	40	45	50	1HR	0	1HR	2HR	3HR	4HR	8HR	12HR	0	1HR	2HR	3HR	4HR	8HR	12 HR	0
64	65.3333	62.6667	65	64	64.6667	64	64.6667						92	93	91	94	96	95	96	46	48	46	48	47	51	49	61.3333
62.6667	64.6667	64	65	61.6667	64.6667	65.3333							92	91	93	95	94	96	97	47	45	47	49	46	49	50	62
64.6667	65.3333	62	64.3333	65.6667	64.6667	63.3333	65.3333						90	92	94	96	97	95	98	45	46	47	49	49	48	46	60
65	63.3333	65.3333	65	65.6667	64	64.6667	64.6667	65.3333					90	93	94	96	94	95	97	46	46	46	49	49	49	47	60.6667
64	61.3333	63.6667	64.6667	64.6667	62	65.3333	66.6667						96	95	95	97	99	98	97	48	49	47	49	46	48	46	64
63.3333	60	65.3333	65	64	64	64	64.6667						92	95	94	96	97	98	96	46	47	47	51	47	46	49	61.3333
64.6667	58.6667	60.6667	62.6667	60.6667	62.6667	61.6667	63.3333						93	94	94	96	97	98	96	47	46	46	50	50	46	48	62.3333
64	56.3333	61.3333	60	61.3333	65	63	65.3333						93	96	94	95	97	94	95	46	48	46	50	50	47	49	61.6667
65.3333	64.6667	65.3333	64.6667	64.6667	64.6667	64.6667	64.6667						91	94	93	96	95	97	98	45	47	46	49	46	51	49	60.3333
64.6667	63.3333	63.6667	64.6667	65.3333	64.3333	65	65.3333						92	95	93	95	94	96	98	46	48	46	50	46	49	46	61.3333
64.3333	62	63.3333	65.3333	64.6667	64.6667	64	64.6667						92	94	93	96	98	95	96	47	46	43	49	48	50	49	62
65.3333	64	65.6667	64.3333	64.6667	64	68.6667	67.3333						94	94	92	96	98	97	99	46	46	46	49	53	49	46	62
64	60.6667	64.6667	64.6667	63	66	64.6667	65.3333	64.667					90	91	95	96	96	98	96	45	46	51	48	49	49	49	60
64	62.6667	64.3333	64	65.3333	64	61							94	96	94	97	95	94	97	47	49	48	49	51	49	49	62.6667
64	64.6667	64.3333	64.6667	64.3333	64.6667	64	63.3333						89	91	92	90	93	94	95	43	45	46	45	48	48	49	58.3333
65.3333	63	64.3333	64	64	64	64.6667	64						93	91	96	94	96	98	96	46	45	49	50	48	47	48	61.6667
64.6667	65.3333	64.6667	63.6667	60.6667	63	62.3333	62						94	96	96	98	96	95	97	47	48	49	45	48	49	47	62.6667
65.3333	65.3333	64.6667	64.6667	65	62.6667	64.6667	64.6667						94	92	96	94	98	96	94	48	51	48	49	49	46	48	63.3333
65.6667	63.3333	64	65.3333	63.6667	64	65.3333	66						84	86	90	91	88	90	92	42	46	51	50	42	43	49	56
62.6667	62.6667	64.6667	62.3333	61.6667	65.3333	64.6667	64						94	92	94	96	97	95	96	46	51	46	48	49	50	48	62
64.3333	64	63.3333	64.3333	64.6667	64	65	65						94	96	95	94	96	94	93	47	55	47	51	48	44	49	62.6667
64.6667	65	65	64.6667	64.6667	64.6667	65.3333	65.3333						96	94	94	92	94	96	94	50	47	48	46	48	46	46	65.3333
64	64	64	62.3333	61.6667	65.3333	64	65.3333	64.667																			

POST OP MAP							POST OP COMPLICATIONS											
1HR	2HR	3HR	4HR	8HR	12HR		RESPIRATORY DEPRESSIO			APNOEA			URINARY RETENTION			PONV		
63	61	63.3333	63.3333	65.6667	61.3333		0	0	0	0	0	0	0	0	0	0	0	
60.3333	62.3333	64.3333	62	64.6667	62		0	0	0	0	0	0	0	0	0	0	0	
61.3333	62.6667	64.6667	65	63.6667	60		0	0	0	0	0	0	0	0	0	0	0	
61.6667	62	64.6667	64	64.3333	60.6667		0	0	0	0	0	0	0	0	0	0	0	
64.3333	63	65	63.6667	64.6667	64		0	0	0	0	0	0	0	0	0	0	0	
63	62.6667	66	63.6667	63.3333	61.3333		0	0	0	0	0	0	0	0	0	0	0	
62	62	65.3333	65.6667	63.3333	62.3333		0	0	0	0	0	0	0	0	0	0	0	
64	62	65	65.6667	62.6667	61.6667		0		0	0	0		0	0	0		0	
62.6667	61.6667	64.6667	62.3333	66.3333	60.3333		0	0	0	0	0	0	0	0	0	0	0	
63.6667	61.6667	65	62	64.6667	61.3333		0	0	0	0	0	0	0	0	0	0	0	
62	59.6667	64.6667	64.6667	65	62		0	0	0	0	0	0	0	0	0	0	0	
62	61.3333	64.6667	68	65	62		0	0	0	0	0	0	0	0	0	0	0	
61	65.6667	64	64.6667	65.3333	60		0	0	0	0	0	0	0	0	0	0	0	
64.6667	63.3333	65	65.6667	64	62.6667		0	0	0	0	0	0	0	0	0	0	0	
60.3333	61.3333	60	63	63.3333	58.3333		0	0	0	0	0	0	0	0	0	0	0	
60.3333	64.6667	64.6667	64	64	61.6667		0	0	0	0	0	0	0	0	0	0	0	
64	64.6667	62.6667	64	64.3333	62.6667		0	0	0	0	0	0	0	0	0	0	0	
64.6667	64	64	65.3333	62.6667	63.3333		0	0	0	0	0	0	0	0	0	0	0	
59.3333	64	63.6667	57.3333	58.6667	56		0	0	0	0	0	0	0	0	0	0	0	
64.6667	62	64	65	65	62		0	0	0	0	0	0	0	0	0	0	0	
68.6667	63	65.3333	64	60.6667	62.6667		0	0	0	0	0	0	0	0	0	0	0	
62.6667	63.3333	61.3333	63.3333	62.6667	65.3333		0	0	0	0	0	0	0	0	0	0	0	

GROUP B (TAP BLOCK)													
FLACC PAIN SCORE												TIME OF 1ST ANALGESIA IN MIN	
S.NO	0	2	4	6	8	12	16	20	24				
1	0	0	0	1	1	3	2	2	3			720	
2	0	0	0	0	1	3	2	2	2			720	
3	0	0	1	3	2	2	1	1	1			480	
4	0	0	0	1	2	3	2	1	2			720	
5	0	0	1	1	3	3	2	1	2			600	
6	0	0	1	2	3	2	1	2	2			600	
7	0	0	2	3	2	2	1	2	2			480	
8	0	0	1	2	3	2	1	2	2			480	
9	0	0	1	2	3	2	2	1	2			600	
10	0	0	1	2	3	2	2	1	2			600	
11	0	0	1	2	2	3	2	1	2			720	
12	0	0	2	3	2	2	1	1	2			480	
13	0	0	1	1	3	2	1	1	2			600	
14	0	0	1	2	3	2	1	2	2			600	
15	0	0	1	2	3	2	1	2	2			600	
16	0	0	2	3	2	2	1	2	2			480	
17	0	0	1	2	2	3	1	2	2			720	
18	0	0	1	2	3	2	2	1	2			600	
19	0	0	1	1	3	2	2	1	2			600	
20	0	0	1	1	3	2	2	1	1			600	
21	0	0	2	3	2	2	1	1	2			480	
22	0	0	1	3	2	2	1	1	2			480	
23	0	0	2	3	2	2	1	2	2			480	